GRAY'S NEW MANUAL OF BOTANY ILLUSTRATED

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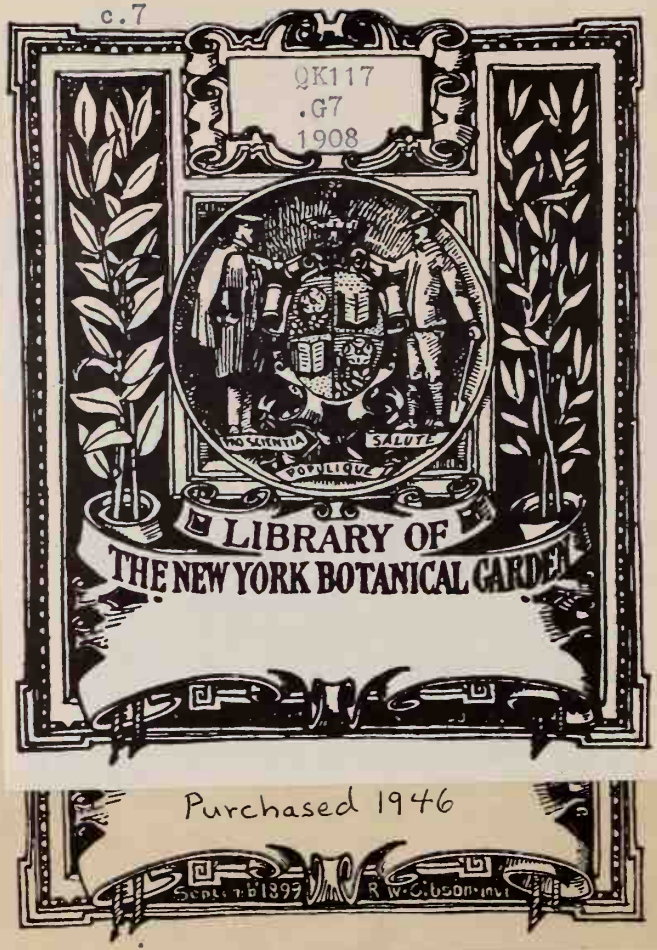

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GRAY'S NEW MANUAL OF BOTANY

(SEVENTH EDITION — ILLUSTRATED)

A HANDBOOK OF THE

FLOWERING PLANTS AND FERNS

OF THE CENTRAL AND NORTHEASTERN UNITED STATES
AND ADJACENT CANADA

REARRANGED AND EXTENSIVELY REVISED BY

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PREFACE

In bringing Dr. Asa Gray's well-known Manual to date and into accord with modern views of classification and nomenclature, the present editors have found it necessary to rearrange it throughout, rewrite considerable portions, modify at least slightly nearly all the descriptions, and adopt certain principles of nomenclature (notably the one relating to the first specific name) somewhat at variance with Dr. Gray's practice. Although these changes have been numerous and in some respects fundamental, it is believed that they are all in thorough accord with the liberal spirit of progress which characterized his own successive publications. Wherever possible and in all cases of doubt, the wording of the sixth edition, prepared by Dr. Sereno Watson and Professor John Merle Coulter, and published in January, 1890, has been retained.

In the arrangement of the plant-families and in grouping them in orders, the admirable system of Eichler, in recent years much elaborated and perfected by Engler and Prantl, has been followed with a few deviations of minor importance.

The term *order*, used by Dr. Gray as synonymous with *family*, is here employed, according to the recommendation of the International Botanical Congress at Vienna, to designate a group of superior rank; the same, in fact, which has sometimes been called a *cohort*. Orders, in this sense, are not capable of sharp definition in the manner of species, genera, or even families, nor is it to be supposed that one order begins in development where the preceding ends. They are rather to be conceived as representing somewhat parallel and long-disconnected lines or tendencies in evolutionary development. The grouping of the families into orders is shown in the tabular view on pages 23–27.

To cover a more natural floral area and to make the Manual convenient for a greater number of users, some alterations have been made in the geographic limits adopted in the sixth edition. These changes result in (1) the exclusion of the territory at the west between the 96th and 100th meridians, a region now known to include a con-

siderable percentage of plants characteristic of the Great Plains and not harmonious with the flora which the present work is especially designed to treat; and (2) the inclusion of the Canadian provinces of Nova Scotia, Prince Edward Island, New Brunswick, and the greater part of Quebec and Ontario. As thus modified the limits are as follows: on the north, the 48th parallel from the Gulf of St. Lawrence to Lake Superior, and the international boundary thence to the northwest corner of Minnesota; on the west, the western boundary of Minnesota and northwestern Iowa, thence southward along the 96th meridian; on the south, the southern boundaries of eastern Kansas, Missouri, Kentucky, and Virginia.

In the preparation of this edition valued assistance has been received from Professor A. S. Hitchcock of the United States Department of Agriculture, who has elaborated the *Gramineae;* Mr. Oakes Ames, Assistant Director of the Botanic Garden of Harvard University, who has treated the *Orchidaceae;* President Ezra Brainerd of Middlebury College, who has revised the genus *Viola;* Mr. A. A. Eaton of the Ames Botanical Laboratory, who has treated the technical genera *Equisetum* and *Isoëtes;* Dr. J. M. Greenman of the Field Museum of Natural History, who has revised *Senecio;* Mr. W. W. Eggleston, who has revised the exceedingly difficult genus *Crataegus;* and Miss Mary A. Day, Librarian of the Gray Herbarium, who has given much clerical and bibliographical assistance throughout the preparation and proof reading of the text. Many of the older figures, formerly grouped in plates, have been redrawn and for greater convenience placed in the text, and to these have been added a much larger number of new ones drawn chiefly by Mr. F. Schuyler Mathews, but in part also by Professor J. Franklin Collins of Brown University and Mr. P. B. Whelpley. All the illustrations of the *Orchidaceae* have been not only skillfully executed but generously contributed by Mrs. Oakes Ames. The fact that it has been possible thus to extend the illustration of the Manual has been due in great part to the interest and liberality of the Visiting Committee of the Gray Herbarium. Many botanists throughout the country, notably the members of the New England Botanical Club, have furnished specimens and notes which have been exceedingly helpful in determining the geographic range and limits of variation. To all who have thus in different ways aided in the preparation of the present work, the editors wish to express their sincere appreciation and cordial thanks.

At the International Botanical Congress, held at Vienna, June,

1905, it was fortunately possible to reach a substantial agreement on the controversial subject of nomenclature. Some mutual concessions were necessary, but it is believed that they will be cheerfully made by those who are really seeking harmony in this matter. The editors have, therefore, scrupulously endeavored to bring the nomenclature of the Manual into accord with the Vienna agreement, in order that American botanical nomenclature may be freed as speedily as possible from peculiarity or provincialism and assume the form which has received international sanction. The most important change in this respect which characterizes the present edition in distinction from the previous editions is the adoption of the earliest specific name instead of that specific name which was first combined with the correct generic name. With this change it becomes more important to trace the previous use of specific names under other genera, and, to facilitate this, it seems wise to adopt the double citation of authorities. In the capitalization of specific and varietal names, it has been thought best to adopt the custom of many prominent botanists from Linnaeus himself to the distinguished editors of the Index Kewensis. The chief change in this respect from the usage of previous editions consists in the decapitalization of geographic adjectives, such as *canadensis*, *americana*, and the like. In regard to these words it should be borne in mind that they are not English and therefore not subject to the rules of English grammar. They are a part of an international system of Latin nomenclature, which should not be modified by different nations by introducing peculiarities of their several languages. Many generic and other names, which were in use prior to 1753, were adopted by Linnaeus and his followers. These names are indicated in the Manual by brackets inclosing the name of the pre-Linnean author; thus, *Polypodium* [Tourn.] L.

In the treatment of the ever increasing number of foreign plants which have been recorded within our range, it has seemed desirable to include in the Manual only those which have given some evidence of self-dissemination and shown some tendency to become permanent members of our flora. Waifs, ballast-weeds, and plants persisting locally after cultivation have in general been omitted.

During the last twenty years there has been an unprecedented activity in the characterization of new species and varieties within our range. The present editors have considerably delayed the issue of this work in order to examine these new propositions and give them recognition in all cases where their merit could be

demonstrated. In a few instances, however, it has been impossible from lack of material or data either to include as valid or to reduce definitely to synonymy such species and varieties, and it has accordingly seemed best not to mention them. It is not thereby meant that they are not of value, but merely that evidence of their distinctness has not been available.

Botanical names, being in many instances latinized forms of geographic, aboriginal, or personal designations, are not always capable of easy or consistent pronunciation. From long-established custom they are usually pronounced in English-speaking countries according to the pronunciation of Latin after the English method, exceptions being frequent in such names as *Michauxiana*, which is commonly pronounced mēshōīà̀nă, or by others mēshōzīà̀nă, to avoid the awkward pronunciation which the word would have according to the English rules. The subject is one into which considerations of taste, convenience, and custom enter to such an extent that it is most difficult to lay down definite principles free from pedantry However, as a general guide, the names in this, as in previous editions, are marked with accents, — the accented syllable being determined as far as possible by the well-known rules of Latin quantity. In cases of doubtful quantity, in such names as *Berlandiera*, *Palmeri*, *Bacopa*, etc., it has seemed best to treat the penultimate vowel as long, according to the usage of most British and Continental writers. Two accents are used, the grave (`) to indicate the long English sound of the vowel, the acute (´) to show the shortened or otherwise modified sound. For aid in determining the accented syllable, the editors are in several instances indebted to Dr. A. S. Pease.

In consideration of recent differences in nomenclatorial practice, and with a wish to make the Manual as convenient as possible for all users, synonyms have been inserted freely to show the equivalence of different names, especially of those permitted by the Rochester and American Codes but not sanctioned by the International Rules. It has been necessary to make these citations exceedingly brief, the specific name, when the same, being omitted; *e.g.* under *Ranunculus Cymbalaria* Pursh, the synonym *Oxygraphis* Prantl means that the species has been treated by Prantl under the identical specific name (*Cymbalaria*) in *Oxygraphis*, a genus not maintained in the present work.

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ANALYTICAL KEY TO THE FAMILIES

(Carried out, in some cases, to subfamilies and genera)

Division I. PTERIDÓPHYTA

Fern-like, moss-like, rush-like, or aquatic plants without true flowers. Reproduction by spores (without embryos).

A. Floating plants with small 2-ranked leaves; sporocarps borne on the under side of the stem — Salviniaceae, 50

A. Terrestrial or submersed plants, not floating B.

B. Stems conspicuously jointed, their nodes covered by toothed sheaths; sporangia on the scales of terminal dry cone-like spikes — Equisetaceae, 5[illegible]

B. Stems without conspicuous sheathed joints C.

C. Leaves closely imbricated or very narrow; sporangia sessile, axillary.

Stem short, corm-like; leaves elongate, awl-shape or linear, in a rosette — Isoëtaceae, 58

Stem elongate, creeping (sometimes underground) or branching; leaves very short, crowded or imbricated.

Sporangia of two kinds, some containing many minute spores (microspores), others bearing few (usually 3–4) much larger macrospores — Selaginellaceae, 57

Sporangia bearing uniform minute spores — Lycopodiaceae, 54

C. Leaves (fronds) not closely imbricated; if narrow, without axillary sporangia D.

D. Leaves (fronds) 4-foliolate, clover-like; sporocarps (inclosing the sporangia) stalked from the creeping stem — Marsileaceae, 49

D. Leaves (fronds) not 4-foliolate, simple or variously cleft; sporangia not inclosed in basal sporocarps E.

E. Fertile fronds, or fertile portions of the fronds conspicuously unlike the sterile F.

F. Slender twining or climbing plant, the frond with alternate paired and stalked palmately lobed divisions — *Lygodium*, 46

F. Neither twining nor climbing G.

G. Sterile fronds linear-filiform, tortuous; the fertile filiform, tipped by a 1-sided short (3–8 mm. long) pinnate fertile portion — *Schizaea*, 45

G. Sterile fronds (or segments) broader H.

H. Sterile segment of the frond simple; the fertile a long-stalked simple spike — Ophioglossaceae, 47

H. Sterile and fertile fronds or segments more or less cleft I.

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I. Rootstock almost none, the solitary (rarely 2) fronds appearing to rise from a cluster of fleshy roots; lower segment sterile, upper fertile and bearing 2-rowed globular sporangia *Botrychium*, 41

I. Rootstock well developed, elongate or stout, the roots fibrous; fronds numerous or the fertile and sterile clearly distinct J.

J. Fertile fronds or segments scarcely or not at all leaf-like, the sporangia globose or in bead-like rows.

Sporangia naked, globose, thin-walled, 2-valved, densely crowded, not 2-ranked OSMUNDACEAE, 46

Sporangia inclosed in pod-like or berry-like 2-ranked divisions of fertile frond *Onoclea*, 45

J. Fertile fronds or segments green and leaf-like, at least above; the sporangia not globose POLYPODIACEAE, 33

E. Fertile fronds or segments essentially like the sterile.

Sporangia sessile at the base of a bristle-like receptacle and surrounded by a cup-like involucre; frond of a single layer of cells HYMENOPHYLLACEAE, 35

Sporangia stalked, with no bristle-like receptacle; frond of more than one layer of cells POLYPODIACEAE, 33

DIVISION II. SPERMATÓPHYTA

Plants with true flowers containing stamens, pistils, or both. Reproduction normally by seeds containing an embryo.

SUBDIVISION I. GYMNOSPÉRMAE

Ovules not in a closed ovary. Trees and shrubs with needle-shaped, linear, or scale-like mostly evergreen leaves, and monoecious or dioecious flowers K.

K. Flowers themselves catkin-like or borne in catkins, which become cones or berry-like PINACEAE, 62

K. Flowers solitary, axillary; seed solitary, more or less enveloped in a pulpy disk TAXACEAE, 62

SUBDIVISION II. ANGIOSPÉRMAE

Ovules borne in a closed ovary, which at maturity becomes the fruit.

CLASS 1. MONOCOTYLEDÒNEAE

Stems without central pith or annular layers, but having the woody fibers distributed through them (a transverse slice showing the fibers as dots scattered through the cellular tissue). Embryo with a single cotyledon, the early leaves always alternate. Parts of the flower usually in threes or sixes, never in fives. Leaves mostly parallel-veined. Our species, except in the genus *Smilax*, herbaceous L.

L. Small lens-shaped, ellipsoidal, or flask-shaped free-swimming aquatics without true leaves LEMNACEAE, 259

L. Plants with stems and leaves (sometimes scale-like) M.

M. Perianth free from the ovary or none N.

N. Perianth wanting or of scale-like or bristle-form divisions O.
O. Flowers inclosed or subtended by imbricated husk-like scales (glumes); grass-like plants with jointed stems, sheathing (mostly narrow) leaves, and 1-seeded fruit.
Stems round or flattened; leaves of vegetative shoots 2-ranked, sheaths usually split; anthers attached by the middle — GRAMINEAE, 86
Stems usually more or less triangular, solid; leaves 3-ranked, sheaths not split; anthers attached at the base — CYPERACEAE, 171
O. Flowers not inclosed in husk-like scales (though sometimes in involucrate heads) P.
P. Immersed aquatics, branching and leafy, the upper leaves often floating.
Flowers perfect — NAJADACEAE, 69
Flowers monoecious or dioecious.
Flowers in globose heads — SPARGANIACEAE, 68
Flowers axillary, solitary — NAJADACEAE, 69
P. Terrestrial or marsh plants Q.
Q. Leaves petioled, the blade net-veined — ARACEAE, 257
Q. Leaves linear or sword-shaped, parallel-veined, not petioled R.
R. Flowers monoecious or dioecious.
Flowers in cylindrical spikes — TYPHACEAE, 67
Flowers in heads.
Heads spheroidal, pubescent, involucrate — ERIOCAULACEAE, 260
Heads globose, glabrous, not involucrate — SPARGANIACEAE, 68
R. Flowers perfect.
Flowers in a dense spike, this borne on the margin of a 2-edged scape; root aromatic — *Acorus*, 258
Scapes or peduncles cylindrical.
Ovaries 3-6, separating at least when ripe — JUNCAGINACEAE, 79
Ovary single, 3-carpeled — JUNCACEAE, 267
N. Perianth always present, herbaceous or colored, neither scale-like nor bristle-form S.
S Pistils numerous in a head or ring — ALISMACEAE, 80
S. Pistil one, compound (cells or placentae mostly 3) T.
T. Stamens 3.
Moss-like, aquatic; flowers solitary — MAYACACEAE, 263
Rush-like marsh or bog plants; flowers in spikes, racemes, or heads.
Flowers racemose or spicate — JUNCAGINACEAE, 79
Flowers in dense scaly heads — XYRIDACEAE, 262
T. Stamens 4 — *Maianthemum*, 291
T. Stamens 6 U.
U. Stamens all alike and fertile.
Gray scurfy moss-like epiphyte — BROMELIACEAE, 265
Not epiphytic.
Ovary of nearly separate carpels — JUNCAGINACEAE, 79
Ovary (often angled or lobed) not deeply cleft.
Divisions of the perianth alike or nearly so.
Perianth woolly — HAEMODORACEAE, 296
Perianth not woolly.
Plant rush-like; perianth small, greenish or purplish brown — JUNCACEAE, 267

Plant not rush-like — LILIACEAE, 279
Divisions of the perianth unlike, 3 green sepals and 3 colored petals.
Stem-leaves ovate or oblong, 3 in a whorl — *Trillium*, 293
Stem-leaves linear or nearly so; flowers umbeled — COMMELINACEAE, 264
U. Stamens dissimilar, or only 3 with fertile anthers.
Perianth of 3 herbaceous sepals and 3 colored ephemeral petals — COMMELINACEAE, 264
Perianth tubular, 6-lobed — PONTEDERIACEAE, 266
M. Perianth present, adnate to the ovary V.
V. Stamens 1–2; flowers irregular.
Anthers 2-celled; seeds many — ORCHIDACEAE, 304
Anthers 1-celled; seeds solitary — MARANTACEAE, 304
V. Stamens 3 or more; flowers mostly regular or nearly so W.
W. Climbing plant with net-veined ovate leaves — DIOSCOREACEAE, 297
W. Not climbing; leaves parallel-veined.
Perianth woolly, only partially adnate to the ovary — HAEMODORACEAE, 296
Perianth not woolly, adnate to the whole surface of the ovary.
Aquatics; flowers dioecious or polygamous — HYDROCHARITACEAE, 85
Terrestrial; flowers perfect.
Stamens 6 — AMARYLLIDACEAE, 297
Stamens 3.
Leaves 2-ranked, equitant; stamens opposite the outer segments of the perianth — IRIDACEAE, 299
Leaves not 2-ranked, the cauline scale-like; stamens opposite the inner segments of the perianth — BURMANNIACEAE, 304

CLASS 2. DICOTYLEDÒNEAE

Stems formed of bark, wood, and pith; the wood forming a zone between the other two, and increasing, when the stem continues from year to year, by the annual addition of a new layer to the outside, next the bark. Leaves net-veined. Embryo with a pair of opposite cotyledons. Parts of the flower mostly in fours or fives (rarely in threes or sixes) X.

X. Corolla none; calyx present or absent Y.
Y. Flowers monoecious or dioecious, one or both sorts in catkins Z.
Z. Only one sort of flowers in catkins or catkin-like heads.
Fertile flowers in a short catkin or catkin-like head — URTICACEAE, 344
Fertile flowers single or clustered; the sterile in slender catkins (except in *Fagus*).
Leaves pinnate; fertile flowers and fruit naked — JUGLANDACEAE, 330
Leaves simple; fertile flowers 1–3 in a cup or involucre — FAGACEAE, 337
Z. Both sterile and fertile flowers in catkins or catkin-like heads *a*.
a. Ovary many-ovuled; fruit many-seeded.
Ovary and pod 2-celled; seeds not tufted — *Liquidambar*, 453
Ovary and pod 1-celled; seeds hairy-tufted — SALICACEAE, 320

a. Ovary 1–2-celled; cells 1-ovuled; fruit 1-seeded.
Parasitic on trees; fruit a berry — LORANTHACEAE, 351
Trees and shrubs, not parasitic.
Calyx regular, in fertile flower succulent in fruit — URTICACEAE, 344
Calyx none or rudimentary and scale-like.
Style and stigma 1, simple.
Leaves palmately angled or lobed — PLATANACEAE, 454
Leaves ovate or oblong, entire — LEITNERIACEAE, 330
Styles or long stigmas 2.
Fertile flowers 2 or 3 at each scale of the catkin — BETULACEAE, 332
Fertile flowers single under each scale; nutlets naked, waxy-coated, or drupe-like — MYRICACEAE, 329
V. Flowers not in catkins *b.*
b. Ovary or its cells containing only 1–2 (rarely 3–4) ovules *c.*
c. Pistils more than 1, distinct or nearly so.
Stamens inserted on the calyx; leaves with stipules — ROSACEAE, 454
Stamens inserted on the receptacle.
Leaves punctate with transparent dots — *Zanthoxylum*, 537
Leaves not dotted.
Calyx present, usually colored or petal-like — RANUNCULACEAE, 392
Calyx none; flowers spiked — PIPERACEAE, 320
c. Pistil 1, simple or compound *d.*
d. Ovary free from the calyx, which is sometimes wanting *e.*
e. Stipules (ocreae) sheathing the stem at the nodes.
Tree; calyx none — PLATANACEAE, 454
Herbs; calyx present, commonly corolla-like — POLYGONACEAE, 353
e. Stipules not sheathing the stem, or none *f.*
f. Herbs *g.*
g. Aquatic, submerged or nearly so.
Leaves whorled, dissected; style 1 — CERATOPHYLLACEAE, 389
Leaves opposite, entire; styles 2; ovary 4-celled — CALLITRICHACEAE, 549
g. Not aquatics *h.*
h. Styles 10; ovary and berry 10-celled — PHYTOLACCACEAE, 374
h. Style, if any, and stigma 1.
Flowers unisexual; ovary of the fertile flowers 1-celled — URTICACEAE, 344
Flowers perfect; pod 2-celled, 2-seeded — *Lepidium*, 425
h. Styles 2–3 or branched; ovary 1–4-celled *i.*
i. Leaves palmately lobed or divided — *Cannabineae*, 344
i. Leaves not palmately lobed or divided *j.*
j. Ovary and pod 3-celled; juice usually milky.
Flowers in basal spikes; stamens 4; filaments thick, flattened — BUXACEAE, 550
Inflorescence various, not of basal spikes; stamens 1–∞, rarely 4; filaments not conspicuously thick — EUPHORBIACEAE, 540
j. Ovary not 3-celled; juice not milky *k.*
k. Flowers in numerous small involucrate heads; fruit a 3-angled achene — *Eriogonum*, 353
k. Flowers not involucrate.
Leaves covered at least beneath with stellate hairs; embryo straight — EUPHORBIACEAE, 540

Leaves without stellate hairs; embryo curved or coiled.
Stipules scarious — ILLECEBRACEAE, 376
Stipules none.
Leaves opposite.
Plant fleshy — *Salicornia*, 369
Not fleshy.
Flowers in heads or spikes, these often panicled; anthers 1-celled — AMARANTHACEAE, 371
Flowers sessile in forks of branching inflorescence — ILLECEBRACEAE, 376
Leaves alternate.
Flowers and bracts scarious — AMARANTHACEAE, 371
Flowers small, chiefly greenish; no scarious bracts — CHENOPODIACEAE, 364

f. Shrubs or trees.
Leaves small, linear or scale-like; low heath-like shrubs — EMPETRACEAE, 551
Leaves oblong to orbicular; never heath-like.
Leaves opposite.
Fruit 3-celled, not winged — RHAMNACEAE, 560
Fruit 2-celled, a double samara — ACERACEAE, 557
Fruit 1-celled, a single samara — OLEACEAE, 650
Leaves alternate.
Ovary 3-celled — RHAMNACEAE, 560
Ovary 1–2-celled.
Styles and stigmas 2 — URTICACEAE, 344
Style and stigma 1.
Anthers opening lengthwise — THYMELAEACEAE, 589
Anthers opening by uplifted lids — LAURACEAE, 413

d. Ovary inferior or so closely and permanently invested by the calyx as to appear so.
Parasites on the branches of trees — LORANTHACEAE, 351
Aquatic herbs — HALORAGIDACEAE, 602
Terrestrial.
Herbs with calyx colored like a corolla.
Leaves opposite, simple — NYCTAGINACEAE, 375
Leaves alternate, pinnate — *Sanguisorba*, 494
Leaves alternate, simple — *Comandra*, 350
Shrubs or trees.
Leaves scurfy — ELAEAGNACEAE, 590
Leaves not scurfy, opposite — *Nestronia*, 350
Leaves not scurfy, alternate.
Style 1, stigmatic down one side; flowers solitary, in pairs, or in umbel-like clusters — *Nyssa*, 625
Style 1, short; stigma terminal; flowers racemose — *Pyrularia*, 350
Styles 2 — HAMAMELIDACEAE, 452

b. Ovary or its cells containing many ovules *l.*
l. Calyx none; ovary and fruit naked.
Aquatic herb — PODOSTEMACEAE, 441
Tree or shrub — HAMAMELIDACEAE, 452
l. Calyx present *m.*
m. Ovary superior.

Ovaries 2 or more, separate — RANUNCULACEAE, 392
Ovary single.
Ovary 5-celled, 5-beaked; leaves scattered — *Penthorum*, 442
Ovary 3–5-celled; leaves opposite or whorled — AIZOACEAE, 377
Ovary 1–2-celled.
Leaves compound — RANUNCULACEAE, 392
Leaves simple.
Calyx of separate sepals — CARYOPHYLLACEAE, 377
Calyx 5-toothed or -cleft — *Glaux*, 647
Calyx 4-toothed — LYTHRACEAE, 591
m. Ovary and pod inferior.
Ovary 6-celled; stamens 6–12 — ARISTOLOCHIACEAE, 351
Ovary 4-celled; stamens 4 — *Ludvigia*, 594
Ovary 1-celled; stamens 8–10 — *Chrysosplenium*, 448

X. **Both calyx and corolla present** *n.*
n. **Corolla of separate petals** *o.*
o. Stamens numerous, at least more than 10 (rarely 9–10 in *Polanisia*), and more than twice as many as the sepals or calyx-lobes *p.*
p. Calyx entirely free and separate from the pistil or pistils *q.*
q. Pistils several or many, wholly distinct or united at base into a strongly lobed or several-beaked ovary *r.*
r. Aquatics with peltate leaves — NYMPHAEACEAE, 389
r. Terrestrial plants, or, if aquatic, with leaves not peltate.
Climbers.
Leaves alternate — MENISPERMACEAE, 410
Leaves opposite — *Clematis*, 402
Not climbing.
Filaments united into a tube — MALVACEAE, 566
Filaments not united.
Leaves opposite, entire — CALYCANTHACEAE, 409
Leaves alternate.
Stamens on the calyx — ROSACEAE, 454
Stamens on the receptacle or disk.
Trees or shrubs.
Sepals and petals imbricated — MAGNOLIACEAE, 408
Sepals and petals valvate — ANONACEAE, 410
Herbs
Pistil 1, deeply 3–6-lobed — RESEDACEAE, 439
Carpels distinct or united at base — RANUNCULACEAE, 392
q. Pistils strictly one as to ovary; the styles or stigmas may be several *s.*
s. Leaves punctate with translucent dots — HYPERICACEAE, 571
s. Leaves not punctate *t.*
t. Ovary simple, 1-celled.
Ovules 2 — ROSACEAE, 454
Ovules many. — [RANUNCULACEAE, 392]
Leaves 2–3-ternately compound or dissected
Leaves peltate, lobed — *Podophyllum*, 411
t. Ovary compound.
Ovary 1-celled.
Sepals 2 (rarely 3), caducous; juice milky or colored; placentae parietal — PAPAVERACEAE, 414
Sepals 2; juice watery; placentae central — PORTULACACEAE, 387

Sepals 4; juice watery; placentae parietal CAPPARIDACEAE, 438
Sepals 3 or 5, persistent; juice watery; placentae parietal CISTACEAE, 576
Ovary several-celled.
Calyx valvate in bud.
Herbs or rarely shrubs; stamens united; anthers 1-celled MALVACEAE, 566
Trees; anthers 2-celled TILIACEAE, 565
Calyx imbricate in bud.
Shrubs; stamens on the base of the petals TERNSTROEMIACEAE, 570
Aquatic or marsh-dwelling herbs.
Leaves tubular or trumpet-shaped; placentae in the axis SARRACENIACEAE, 439
Leaves (when mature) flattish, never tubular or trumpet-shaped; ovules on the partitions of the ovary NYMPHAEACEAE, 389

p. Calyx more or less adherent to a compound ovary.
Ovary 7–30-celled.
Cells many-ovuled; aquatic herbs NYMPHAEACEAE, 389
Cells 10, each 1-ovuled; trees or shrubs *Amelanchier*, 459
Ovary 6-celled *Asarum*, 352
Ovary 1–5-celled.
Fleshy-stemmed, without true foliage; petals many CACTACEAE, 588
Leaves present.
Sepals or calyx-lobes 2; ovules arising from the base of a 1-celled ovary PORTULACACEAE, 387
Sepals or calyx-lobes more than 2.
Leaves opposite; stipules none SAXIFRAGACEAE, 444
Leaves alternate.
Stipules present ROSACEAE, 454
Stipules none.
Herbs with rough-pubescent leaves LOASACEAE, 588
Trees or shrubs STYRACACEAE, 649

o. Stamens not more than twice as many as the petals *u*.

u. Stamens of the same number as the petals and opposite them.
Ovaries 3–6, separate; woody vines MENISPERMACEAE, 410
Ovary only one.
Ovary 2–4-celled.
Calyx-lobes minute or obsolete; petals valvate VITACEAE, 562
Calyx 4–5-cleft; petals involute RHAMNACEAE, 560
Ovary 1-celled.
Anthers opening by uplifted lids BERBERIDACEAE, 411
Anthers not opening by uplifted lids.
Style 1, unbranched; stigma 1 PRIMULACEAE, 643
Styles, style-branches, or stigmas more than 1.
Sepals or calyx-lobes 2 PORTULACACEAE, 387
Sepals or calyx-lobes 3–5.
Flowers monoecious *Crotonopsis*, 542
Flowers perfect PLUMBAGINACEAE, 643

u. Stamens not of the same number as the petals, or if of the same number alternate with them *v*.

v. Calyx free from the ovary, *i.e.* ovary wholly superior *w*.

w. Ovaries 2 or more, wholly separate or somewhat united *x*.
x. Stamens united with each other and with a large thick stigma common to the 2 ovaries — ASCLEPIADACEAE, 663
x. Stamens free from each other and from the pistils *y*.
y. Stamens on the receptacle, free from the calyx.
Leaves punctate with translucent dots — RUTACEAE, 537
Leaves without translucent dots.
Trees or shrubs; leaves pinnate.
Low shrub; leaflets mostly 5 — *Zanthorhiza*, 408
Tree; leaflets 11 or more — *Ailanthus*, 538
Herbs.
Leaves fleshy — CRASSULACEAE, 441
Leaves not fleshy.
Ovaries or lobes of the ovary 2–5, with a common style.
Ovary 2–3-lobed — LIMNANTHACEAE, 551
Ovary 5-lobed — GERANIACEAE, 534
Ovaries with separate styles or sessile stigmas — RANUNCULACEAE, 392
y. Stamens inserted on the calyx. — [CRASSULACEAE, 441]
Plant fleshy; stamens just twice as many as the pistils
Plant not fleshy; stamens not twice as many as the pistils.
Stipules present — ROSACEAE, 454
Stipules none — SAXIFRAGACEAE, 444
w. Ovary 1 *z*.
z. Ovary simple with 1 parietal placenta.
Leaves peltate, lobed — *Podophyllum*, 411
Leaves not peltate, simple or compound — LEGUMINOSAE, 499
z. Ovary compound, as shown by the number of its cells, placentae, styles, or stigmas A.
A Ovary 1-celled.
Corolla irregular.
Petals 4; stamens 6 — FUMARIACEAE, 416
Petals and stamens 5 — VIOLACEAE, 579
Corolla regular or nearly so.
Ovule solitary.
Trees or shrubs — ANACARDIACEAE, 552
Herbs — CRUCIFERAE, 418
Ovules more than one.
Ovules at the center or bottom of the cell.
Petals not inserted on the calyx — CARYOPHYLLACEAE, 377
Petals inserted on the throat of a bell-shaped or tubular calyx — LYTHRACEAE, 591
Ovules on 2 or more parietal placentae.
Leaves punctate with translucent dots — HYPERICACEAE, 571
Leaves beset with gland-tipped bristles — DROSERACEAE, 440
Leaves neither punctate nor bristly-glandular.
Petals 4. — [CAPPARIDACEAE, 438]
Stamens essentially equal; pod usually stiped
Stamens unequal, 2 being shorter than the other 4; pod sessile — CRUCIFERAE, 418
Petals 3 or 5.
Ovary stiped — PASSIFLORACEAE, 587
Ovary sessile.

Calyx 5-lobed or of 5 equal sepals — SAXIFRAGACEAE, 444
Calyx of 3 equal or 5 very unequal sepals — CISTACEAE, 576

A. Ovary 2–several-celled B.
B. Flowers irregular C.
C. Anthers opening at the top.
Anthers 6–8, 1-celled — POLYGALACEAE, 538
Anthers 10, 2-celled — *Rhododendron*, 631
C. Anthers opening lengthwise.
Stamens 12 and petals 6 on the throat of the gibbous calyx — *Cuphea*, 593
Stamens 5–10 and petals hypogynous or nearly so.
Ovary 3-celled; trees or shrubs — *Aesculus*, 559
Ovary 5-celled; herbs — BALSAMINACEAE, 560
B. Flowers regular or nearly so D.
D. Stamens neither just as many nor twice as many as the petals.
Trees or shrubs.
Stamens fewer than the 4 petals — OLEACEAE, 650
Stamens more numerous than the petals — ACERACEAE, 557
Herbs.
Petals 5 — HYPERICACEAE, 571
Petals 4 — CRUCIFERAE, 418
D. Stamens just as many or twice as many as the petals E.
E. Ovules and seeds only 1 or 2 in each cell.
Herbs.
Flowers monoecious or dioecious — EUPHORBIACEAE, 540
Flowers perfect and symmetrical.
Cells of the ovary as many as the sepals.
Ovary 2–3-celled — LIMNANTHACEAE, 551
Ovary 5-celled — GERANIACEAE, 534
Cells of the ovary twice as many as the sepals.
Leaves abruptly pinnate — ZYGOPHYLLACEAE, 536
Leaves simple — LINACEAE, 531
Shrubs or trees.
Leaves compound.
Leaves 3-foliolate, punctate — *Ptelea*, 537
Leaves pinnate, not punctate — SAPINDACEAE, 559
Leaves simple.
Leaves palmately veined — ACERACEAE, 557
Leaves pinnately veined.
Leaves alternate.
Climbing shrub — *Celastrus*, 557
Erect shrubs or trees.
Flowers racemose — CYRILLACEAE, 553
Flowers solitary or cymose — AQUIFOLIACEAE, 554
Leaves opposite — CELASTRACEAE, 556
E. Ovules, and usually seeds, several or many in each cell F.
F. Leaves compound.
Tree or shrub — STAPHYLEACEAE, 557
Herbs; leaves alternate, or all radical.
Leaflets 3, obcordate — OXALIDACEAE, 532
Leaflets more numerous, pointed — *Astilbe*, 444
F. Leaves simple
Stipules present between opposite leaves — ELATINACEAE, 575

Stipules none when the leaves are opposite.
Stamens 5, united at base into a 10-toothed cup or tube; leaves all radical — *Galax*, 642
Stamens free from each other.
Style 1.
Stamens free from the calyx — ERICACEAE, 625
Stamens inserted on the calyx — LYTHRACEAE, 591
Styles 2–5, or splitting into 2 in fruit.
Stamens free from the calyx; leaves opposite — CARYOPHYLLACEAE, 377
Stamens inserted on the calyx — SAXIFRAGACEAE, 444

v. Calyx-tube adherent to the ovary, at least to its lower half G.
G. Tendril-bearing and often succulent herbs — CUCURBITACEAE, 764
G. Not tendril-bearing H.
H. Ovules and seeds more than 1 in each cell.
Ovary 1-celled.
Sepals or calyx-lobes 2; ovules borne at the base of the ovary — PORTULACACEAE, 387
Sepals or calyx-lobes 4–5; placentae 2–3, parietal — SAXIFRAGACEAE, 444
Ovary 2–many-celled.
Anthers opening by pores at the apex — MELASTOMACEAE, 593
Anthers not opening by pores.
Stamens inserted on or about a flat disk which covers the ovary — CELASTRACEAE, 556
Stamens inserted on the calyx.
Style 1; stamens 4 or 8 (rarely 5) — ONAGRACEAE, 594
Styles 2–3, distinct; stamens 5 or 10 — SAXIFRAGACEAE, 444
H. Ovules and seeds only 1 in each cell.
Stamens 5 or 10.
Trees or shrubs.
Leaves simple, not prickly — *Crataegus*, 460
Leaves compound, or prickly — ARALIACEAE, 605
Herbs.
Fruit dry, splitting at maturity; styles 2 — UMBELLIFERAE, 607
Fruit berry-like; styles 2–5, separate or united — ARALIACEAE, 605
Stamens 2, 4, or 8.
Style and stigma 1; fruit a drupe — CORNACEAE, 623
Styles or stigmatic branches or sessile stigmas usually more than 1; fruit not drupaceous.
Shrubs or trees — HAMAMELIDACEAE, 452
Herbs.
Style 1; stigma 2–4-lobed — ONAGRACEAE, 594
Styles or sessile stigmas 4 — HALORAGIDACEAE, 602

n. **Petals more or less united** I.
I. Stamens more numerous than the lobes of the corolla J.
J. Ovary 1-celled.
Placenta 1, parietal — LEGUMINOSAE, 499
Placentae 2, parietal — FUMARIACEAE, 416
Placenta at the center or base of the ovary — STYRACACEAE, 649
J. Ovary 2-celled; cells 1-ovuled — POLYGALACEAE, 538
J. Ovary 3–∞-celled K.
K. Stamens free from the corolla.
Style 1; leaves simple — ERICACEAE, 625
Styles 5; leaves 3-foliolate — OXALIDACEAE, 532

K. Stamens attached to the base or tube of the corolla.
Saprophytic herbs without green foliage — *Monotropoideae*, 626
Not saprophytic; foliage green.
Trees, shrubs, or undershrubs; anthers mostly 2-celled.
Filaments united into 1–5 groups.
Ovary superior — TERNSTROEMIACEAE, 570
Ovary at least partly inferior — STYRACACEAE, 649
Filaments free from each other.
Style 1 — ERICACEAE, 625
Styles 4 — EBENACEAE, 648
Herbs; anthers 1-celled.
Filaments united into a tube — MALVACEAE, 566
Filaments distinct, 2 at each notch of the corolla — *Adoxa*, 761
I. Stamens not more numerous than the corolla-lobes L.
L. Stamens of the same number as the corolla-lobes and opposite them.
Corolla appendaged with scales inside; ovary 5-celled; trees or shrubs — SAPOTACEAE, 648
Corolla not appendaged with scales inside; ovary 1-celled; herbs.
Style 1; fruit a several–many-seeded capsule — PRIMULACEAE, 643
Styles 5; fruit a 1-seeded utricle — PLUMBAGINACEAE, 643
L. Stamens alternate with the corolla-lobes or fewer M.
M. Ovary free from the calyx-tube (superior) N.
N. Corolla regular O.
O. Stamens as many as the corolla-lobes P.
P. Ovaries more than 1, or, if 1, deeply lobed Q.
Q. Ovaries 2, or, if 1, 2-horned.
Stamens united — ASCLEPIADACEAE, 663
Stamens distinct.
Stipules or stipular membrane or line between opposite leaves; ovary 2-horned — LOGANIACEAE, 652
Stipules none; ovaries 2.
Leaves kidney-shaped, alternate — *Dichondra*, 669
Leaves not kidney-shaped, chiefly opposite — APOCYNACEAE, 661
Q. Ovary deeply 4-lobed.
Leaves alternate — BORAGINACEAE, 679
Leaves opposite — LABIATAE, 690
P. Ovary 1, not deeply lobed R.
R. Ovary 1-celled.
Seed 1; corolla scarious — PLANTAGINACEAE, 743
Seeds several–many.
Leaves entire, opposite — GENTIANACEAE, 654
Leaves toothed, lobed, or compound.
Whole upper surface of corolla white-bearded; leaflets 3, entire — *Menyanthes*, 660
Corolla not conspicuously bearded; leaves, if compound, with toothed leaflets — HYDROPHYLLACEAE, 676
R. Ovary 2–10-celled.
Leafless twining parasites — *Cuscuta*, 671
Leaves opposite, their bases connected by a stipular line — LOGANIACEAE, 652

Leaves alternate or if opposite with no trace of stipules.
Stamens free from the corolla or nearly so.
Style 1 — ERICACEAE, 625
Style none — AQUIFOLIACEAE, 554
Stamens in the notches of the corolla; style 1 — DIAPENSIACEAE, 642
Stamens on the tube of the corolla.
Stamens 4.
Leafy-stemmed; leaves opposite; corolla petaloid — VERBENACEAE, 688
Acaulescent; corolla scarious — PLANTAGINACEAE, 743
Stamens 5 or rarely more.
Fruit of 2 or 4 seed-like nutlets — BORAGINACEAE, 679
Fruit a few–many-seeded pod.
Styles 3 — (rarely in) *Breweria*, 669
Styles 2.
Pod few (mostly 4)-seeded — CONVOLVULACEAE, 668
Pod many-seeded — HYDROPHYLLACEAE, 676
Style 1, often branched.
Branches of the style (or at least the lobes of the stigma) 3.
Not twining — POLEMONIACEAE, 673
Twining — *Ipomoea*, 670
Branches of the style or lobes of the stigma 2 or rarely 4.
Seeds few, mostly 4 — CONVOLVULACEAE, 668
Seeds many — SOLANACEAE, 712

O. Stamens fewer than the corolla-lobes.
Stamens with anthers 4, in pairs.
Ovary 2-celled; cells several-seeded — ACANTHACEAE, 742
Ovary 2–4-celled; cells 1-seeded — VERBENACEAE, 688
Stamens with anthers only 2 or rarely 3.
Ovary 4-lobed — *Lycopus*, 709
Ovary 2-celled, not 4-lobed.
Herbs.
Acaulescent; corolla scarious — PLANTAGINACEAE, 743
Leafy-stemmed; corolla not scarious — *Veronica*, 726
Trees or shrubs — OLEACEAE, 650

N. Corolla irregular S.
S. Stamens with anthers 5.
Stamens free from the corolla; anther-cells opening at the apex — *Rhododendron*, 631
Stamens inserted on the corolla.
Ovary deeply 4-lobed around the style — *Echium*, 688
Ovary not deeply lobed, many-ovuled.
Filaments or some of them woolly — *Verbascum*, 719
Filaments not woolly — *Hyoscyamus*, 716
S. Stamens with anthers 2 or 4.
Ovules solitary in the 1–4 cells.
Ovary 4-lobed; style rising from between the lobes — LABIATAE, 690
Ovary not lobed; style from its apex.
Ovary 1-celled; fruit turned downwards — PHRYMACEAE, 743
Ovary 2–4-celled; fruit not turned downwards — VERBENACEAE, 688
Ovules 2–many in each cell.

Ovary imperfectly 4–5-celled — MARTYNIACEAE, 741
Ovary 1–2-celled.
Ovary 1-celled.
Parasites without green foliage, terrestrial; stamens 4 — OROBANCHACEAE, 739
Not parasitic, chiefly aquatic or mud plants; stamens 2 — LENTIBULARIACEAE, 736
Ovary 2-celled.
Trees or woody climbers; placentae parietal — BIGNONIACEAE, 740
Herbs, rarely trees; placentae in the axis.
Seeds (mostly numerous) not borne on hooks — SCROPHULARIACEAE, 717
Seeds (2–12) borne on hook-like processes of the placentae — ACANTHACEAE, 742

M. Ovary adherent to the calyx-tube (inferior) T.
T. Tendril-bearing herbs; anthers often united — CUCURBITACEAE, 764
T. Tendrils none U.
U. Stamens separate V.
V. Stamens free from the corolla or nearly so, as many as its lobes; stipules none: juice milky — CAMPANULACEAE, 765
V. Stamens inserted on the corolla.
Stamens 1–3, always fewer than the corolla-lobes — VALERIANACEAE, 761
Stamens 4–5; leaves opposite or whorled.
Ovary 2–5-celled.
Leaves opposite or perfoliate, but neither whorled nor provided with true stipules — CAPRIFOLIACEAE, 754
Leaves either opposite and stipulate, or whorled and destitute of stipules — RUBIACEAE, 746
Ovary 1-celled.
Shrubs or trees; flowers in compound cymes; fruit a drupe — *Vibúrnum*, 758
Herbs; flowers in dense involucrate heads; fruit an achene — DIPSACACEAE, 763
U. Stamens united by their anthers; these joined in a ring or tube.
Flowers separate, not involucrate; corolla irregular — LOBELIACEAE, 768
Flowers in an involucrate head — COMPOSITAE, 770

TABULAR VIEW OF THE FAMILIES TREATED IN THIS WORK

Orders, Families, etc.	Genera.		Species.		Varieties and Named Forms.	
	Native.	Introd.	Native.	Introd.	Native.	Introd.
Division I. PTERIDOPHYTA						
Order I. Filicales						
Fam. 1. Hymenophyllaceae	1		1			
" 2. Polypodiaceae	18		58		22	
" 3. Schizaeaceae	2		2			
" 4. Osmundaceae	1		3		5	
" 5. Ophioglossaceae	2		9		7	
" 6. Marsileaceae	1		2			
" 7. Salviniaceae	2		2			
Ord. II. Equisetales						
Fam. 8. Equisetaceae	1		10		5	
Ord. III. Lycopodiales						
Fam. 9. Lycopodiaceae	1		12		10	
" 10. Selaginellaceae	1		3			
" 11. Isoëtaceae	1		13		12	
Division II. SPERMATOPHYTA						
Subdivision I. Gymnospermae						
Ord. IV. Coniferales						
Fam. 12. Taxaceae	1		1			
" 13. Pinaceae	9		24	3	2	
Subdivision II. Angiospermae						
Class I. *MONOCOTYLEDONEAE*						
Ord. V. Pandanales						
Fam. 14. Typhaceae	1		2			
" 15. Sparganiaceae	1		9		2	
Ord. VI. Najadales						
Fam. 16. Najadaceae	5		44	1	17	
" 17. Juncaginaceae	2		4			
" 18. Alismaceae	4		19		11	
" 19. Hydrocharitaceae	3		3			
Ord. VII. Graminales						
Fam. 20. Gramineae	68	19	312	66	42	5
" 21. Cyperaceae	18		322	11	135	
Ord. VIII. Arales						
Fam. 22. Araceae	6		7			
" 23. Lemnaceae	4		9		1	
Ord. IX. Xyridales						
Fam. 24. Eriocaulaceae	3		6			
" 25. Xyridaceae	1		8			
" 26. Mayacaceae	1		1			
" 27. Commelinaceae	2		12			
" 28. Bromeliaceae	1		1			
" 29. Pontederiaceae	2		4		1	

Orders, Families, etc.	Genera.		Species.		Varieties and Named Forms.	
	Native.	Introd.	Native.	Introd.	Native.	Introd.
Ord. X. Liliales						
Fam. 30. Juncaceae	2		49	1	14	
" 31. Liliaceae	29	5	80	7	7	
" 32. Haemodoraceae	2		2			
" 33. Dioscoreaceae	1		1		1	
" 34. Amaryllidaceae	5	1	5	2		
" 35. Iridaceae	3	1	23	4		
Ord. XI. Scitaminales						
Fam. 36. Marantaceae	1		1			
Ord. XII. Orchidales						
Fam. 37. Burmanniaceae	1		1			
" 38. Orchidaceae	18		68		5	
Class II. *DICOTYLEDONEAE*						
Subclass I. Archichlamydeae						
Ord. XIII. Piperales						
Fam. 39. Piperaceae	1		1			
Ord. XIV. Salicales						
Fam. 40. Salicaceae	2		30	10	9	3
Ord. XV. Myricales						
Fam. 41. Myricaceae	1		4			
Ord. XVI. Leitneriales						
Fam. 42. Leitneriaceae	1		1			
Ord. XVII. Juglandales						
Fam. 43. Juglandaceae	2		10		1	
Ord. XVIII. Fagales						
Fam. 44. Betulaceae	5		17	1	6	
" 45. Fagaceae	3		25		6	
Ord. XIX. Urticales						
Fam. 46. Urticaceae	11	2	18	8	3	
Ord. XX. Santalales						
Fam. 47. Santalaceae	3		6			
" 48. Loranthaceae	2		2			
Ord. XXI. Aristolochiales						
Fam. 49. Aristolochiaceae	2		7	1	3	
Ord. XXII. Polygonales						
Fam. 50. Polygonaceae	6	1	43	14	12	1
Ord. XXIII. Chenopodiales						
Fam. 51. Chenopodiaceae	8	2	23	13	6	3
" 52. Amaranthaceae	4	2	9	9	2	1
" 53. Phytolaccaceae	1		1			
" 54. Nyctaginaceae	1		5			
" 55. Illecebraceae	2	1	4	1	1	
" 56. Aizoaceae	1	1	1	1		
Ord. XXIV. Caryophyllales						
Fam. 57. Caryophyllaceae	7	7	37	33	7	2
" 58. Portulacaceae	4		11	2		
Ord. XXV. Ranunculales						
Fam. 59. Ceratophyllaceae	1		1			
" 60. Nymphaeaceae	5		8	1	2	
" 61. Ranunculaceae	19	4	78	15	16	
" 62. Magnoliaceae	2		6			

Orders, Families, etc.	Genera.		Species.		Varieties and Named Forms.	
	Native.	Introd.	Native.	Introd.	Native.	Introd.
Fam. 63. Calycanthaceae	1		2			
" 64. Anonaceae	1		1			
" 65. Menispermaceae	3		3			
" 66. Berberidaceae	5		5	1		
" 67. Lauraceae	4		6			
Ord. XXVI. Papaverales						
Fam. 68. Papaveraceae	3	4	3	9		1
" 69. Fumariaceae	3	1	9	1	1	
" 70. Cruciferae	16	15	56	46	14	1
" 71. Capparidaceae	2		4	1		
" 72. Resedaceae		1		3		
Ord. XXVII. Sarraceniales						
Fam. 73. Sarraceniaceae	1		2		1	
" 74. Droseraceae	1		6		1	
Ord. XXVIII. Rosales						
Fam. 75. Podostemaceae	1		1			
" 76. Crassulaceae	3	1	9	5		
" 77. Saxifragaceae	14		50	4	5	
" 78. Hamamelidaceae	3		3			
" 79. Platanaceae	1		1			
" 80. Rosaceae	20	4	181	33	74	1
" 81. Leguminosae	42	11	145	37	23	1
Ord. XXIX. Geraniales						
Fam. 82. Linaceae	1	1	7	4		
" 83. Oxalidaceae	1		8		1	
" 84. Geraniaceae	1	1	4	9		
" 85. Zygophyllaceae		2		2		
" 86. Rutaceae	2	1	3	1	1	
" 87. Simarubaceae		1		1		
" 88. Polygalaceae	1		14		2	
" 89. Euphorbiaceae	10	2	39	9		
" 90. Callitrichaceae	1		4			
Ord. XXX. Sapindales						
Fam. 91. Buxaceae	1		1			
" 92. Empetraceae	2		2		2	
" 93. Limnanthaceae	1		1			
" 94. Anacardiaceae	1		8		7	
" 95. Cyrillaceae	1		1			
" 96. Aquifoliaceae	2		10		8	
" 97. Celastraceae	3		5	1		
" 98. Staphyleaceae	1		1			
" 99. Aceraceae	1		6		3	
" 100. Sapindaceae	2	1	4	2	2	
" 101. Balsaminaceae	1		3			
Ord. XXXI. Rhamnales						
Fam. 102. Rhamnaceae	3		6	2	1	
" 103. Vitaceae	3		14		5	
Ord. XXXII. Malvales						
Fam. 104. Tiliaceae	1		3			
" 105. Malvaceae	8	3	17	12		
Ord. XXXIII. Violales						
Fam. 106. Ternstroemiaceae	2		3			

Orders, Families, etc.	Genera.		Species.		Varieties and Named Forms.	
	Native.	Introd.	Native.	Introd.	Native.	Introd.
Fam. 107. Hypericaceae	2		25	1	1	
" 108. Elatinaceae	2		4			
" 109. Cistaceae	3		13		3	
" 110. Violaceae	2		43	3	1	
" 111. Passifloraceae	1		2			
" 112. Loasaceae	1		2			
Ord. XXXIV. Opuntiales						
Fam. 113. Cactaceae	2		6		1	
Ord. XXXV. Myrtales						
Fam. 114. Thymelaceae	1	1	1	1		
" 115. Elaeagnaceae	2		3			
" 116. Lythraceae	6		10	2		1
" 117. Melastomaceae	1		4			
" 118. Onagraceae	7	1	48	2	9	
" 119. Haloragidaceae	3		12		3	
Ord. XXXVI. Umbellales						
Fam. 120. Araliaceae	3		7		2	
" 121. Umbelliferae	29	17	57	20	7	
" 122. Cornaceae	2		13		1	
Subclass II. Metachlamydeae						
Ord. XXXVII. Ericales						
Fam. 123. Ericaceae	25	1	78	1	17	
" 124. Diapensiaceae	3		3			
Ord. XXXVIII. Primulales						
Fam. 125. Plumbaginaceae	1		1			
" 126. Primulaceae	10	1	17	5	5	1
Ord. XXXIX. Ebenales						
Fam. 127. Sapotaceae	1		2			
" 128. Ebenaceae	1		1			
" 129. Styracaceae	3		5			
Ord. XL. Gentianales						
Fam. 130. Oleaceae	3	2	9	2	1	
" 131. Loganiaceae	4		4			
" 132. Gentianaceae	10		34	4	3	
" 133. Apocynaceae	3	1	5	1	3	
" 134. Asclepiadaceae	5	1	31	2	3	
Ord. XLI. Polemoniales						
Fam. 135. Convolvulaceae	6		19	9	2	2
" 136. Polemoniaceae	3		14	1	1	
" 137. Hydrophyllaceae	5		16			
" 138. Boraginaceae	7	5	23	16	4	
" 139. Verbenaceae	3		11	2	1	
" 140. Labiatae	21	14	77	42	14	1
" 141. Solanaceae	3	5	19	14	3	1
" 142. Scrophulariaceae	24	5	86	29	7	1
" 143. Lentibulariaceae	2		16			
" 144. Orobanchaceae	3		5	3		
" 145. Bignoniaceae	3		3	1		
" 146. Martyniaceae	1		1			
" 147. Acanthaceae	3		6		2	
" 148. Phrymaceae	1		1			

Orders, Families, etc.	Genera.		Species.		Varieties and Named Forms.	
	Native.	Introd	Native.	Introd.	Native.	Introd.
Ord. XLII. Plantaginales						
Fam. 149. Plantaginaceae	2		12	3	2	
Ord. XLIII. Rubiales						
Fam. 150. Rubiaceae	7	2	34	8	8	
" 151. Caprifoliaceae	8		35	6	8	
" 152. Valerianaceae	2		8	2	3	
" 153. Dipsacaceae		3		5		
Ord. XLIV. Campanulales						
Fam. 154. Cucurbitaceae	4		4			
" 155. Campanulaceae	2	1	8	5	1	1
" 156. Lobeliaceae	1		13		3	
" 157. Compositae	81	25	430	89	123	13

SUMMARY BY DIVISIONS, CLASSES, ETC.

Division, Class, etc.	Genera.		Species.		Varieties and Named Forms.	
	Native.	Introd.	Native.	Introd.	Native.	Introd.
Pteridophyta	31		115		61	
Spermatophyta	790	180	3298	666	705	40
Gymnospermae	10		25	3	2	
Angiospermae	780	180	3273	663	703	40
Monocotyledoneae	184	26	993	92	236	5
Dicotyledoneae	596	154	2280	571	467	35
Archichlamydeae	335	88	1249	321	253	15
Metachlamydeae	261	66	1031	250	214	20

SUMMARY BY MINOR GROUPS

Families			157
Genera	native	821	
	introduced	180	
	total		1001
Species	native	3413	
	introduced	666	
	total		4079
Varieties, named forms, etc.	native	766	
	introduced	40	
	total		806

Whole number of different plants (species, varieties, and named forms) treated in this work 4885

EXPLANATION OF ABBREVIATIONS OF AUTHORS' NAMES

A. Br. — Braun, Alexander.
Adans. — Adanson, Michel.
A. DC. — De Candolle, Alphonse.
Ait. — Aiton, William.
Ait. f. — Aiton, William Townsend.
All. — Allioni, Carlo.
Anders. — Andersson, Nils Johan.
Andr. — Andrews, Henry C.
Andrz. — Andrzejowski, Anton Lukianowicz.
Ard. — Arduino, Pietro.
Arn. — Arnott, George A. Walker.
Asch. — Ascherson, Paul.
Aust. — Austin, Coe Finch.
B. & H. — Bentham, George, and Hooker, Joseph Dalton.
Bab. — Babington, Charles Cardale.
Baill. — Baillon, Henri Ernest.
Baldw. — Baldwin, William.
Barn. — Barneoud, F. Marius.
Bartl. — Bartling, Friedrich Gottlieb.
Bartr. — Bartram, William.
Beauv. — Beauvois, A. M. F. J. Palisot de.
Benn. — Bennett, Arthur.
Benth. — Bentham, George.
Bernh. — Bernhardi, Johann Jacob.
Bess. — Besser, Wilhelm S. J. G. von.
Bieb. — Bieberstein, Friedrich August, Marschall von.
Bigel. — Bigelow, Jacob.
Bjornstr. — Bjornström, Friedrich Johann.
B. Juss. — Jussieu, Bernard de.
Boeckl. — Boeckeler, Otto.
Boenn. — Boenninghausen, C. M. F. von.
Boerh. — Boerhaave, Hermann.
Boiss. — Boissier, Edmond.
Borkh. — Borkhausen, M. B.
Br., A. Br. — Braun, Alexander.
Br., P. Br. — Browne, Patrick.
Br., R. Br. — Brown, Robert.
Brack. — Brackenridge, William D.
Briq. — Briquet, John.
BSP. — Britton, Nathaniel Lord, Sterns, E. E., and Poggenberg, Justus F.
Burm. f. — Burman, Nikolaus Laurens.
C. & S. — Chamisso, Adalbert von, and Schlechtendal, D. F. L. von.
C. A. Mey. — Meyer, Carl Anton.
Carr. — Carrière, Élie Abel.
Casp. — Caspary, Robert.
Cass. — Cassini, Henri.
Cav. — Cavanilles, Antonio José.
Čelak. — Čelakovsky, Ladislav.
Cerv. — Cervantes, Vicente.
Cham. — Chamisso, Adalbert von.
Chapm. — Chapman, Alvan Wentworth.
Chois. — Choisy, Jacques-Denis.
Clayt. — Clayton, John.
Coult. — Coulter, John Merle.
Cyrill. — Cirillo, Domenico.
Darl. — Darlington, William.
Davenp. — Davenport, George Edward.
DC. — De Candolle, Augustin Pyramus.
DC., A. DC. — De Candolle, Alphonse.
Dcne. — Decaisne, Joseph.
Desf. — Desfontaines, René Louiche.
Desr. — Desrousseaux.
Desv. — Desvaux, Augustin Nicaise.
Dietr. — Dietrich, Albert.
Dill. — Dillenius, Johann Jacob.
Dougl. — Douglas, David.
Dufr. — Dufresne, Pierre.
Duham. — Du Hamel du Monceau, H. L.
Dumont. — Du Mont de Courset, G. L. M.
Dumort. — Dumortier, Barthélemy C.
Dur. — Durieu de Maisonneuve.
Eat. — Eaton, Amos.
Ehrh. — Ehrhart, Friedrich.
Ell. — Elliott, Stephen.
Endl. — Endlicher, Stephan Ladislaus.
Engelm. — Engelmann, George.
Esch. — Eschscholtz, Johann Friedrich.
Fisch. — Fischer, F. E. Ludwig von.
Forst. — Forster, J. R. and George.
Foug. — Fougeroux, Auguste Denis.

Fourn.—Fournier, Eugène.
Fresn.—Fresenius, J. B. G. W.
Froel.—Froelich, Joseph Aloys.
Gaertn.—Gaertner, Joseph.
Gal.—Galeotti, Henri.
Gaud.—Gaudichaud-Beaupré, Charles.
G. F. W. Mey.—Meyer, Georg Friedrich Wilhelm.
Gilib.—Gilibert, Jean Emmanuel.
Gmel.—Gmelin, Samuel Gottlieb.
Gmel., J. F. Gmel.—Gmelin, Johann Friedrich.
Gmel., J. G. Gmel.—Gmelin, Johann Georg.
Godr.—Godron, Dominique Alexandre.
Good.—Goodenough, Samuel.
Grab.—Grabowski, Heinrich Emanuel.
Graebn.—Graebner, Paul.
Gren.—Grenier, Charles.
Grev.—Greville, Robert Kaye.
Griseb.—Grisebach, Heinrich R. A.
Gronov.—Gronovius, Jan Fredrik.
Gunn.—Gunnerus, Johann Ernst.
Guss.—Gussoni, Giovanni.
H. & A.—Hooker, William Jackson, and Arnott, G. A. Walker.
Hack.—Hackel, Eduard.
Hartm.—Hartman, Carl Johan.
Hassk.—Hasskarl, Justus Carl.
Haussk.—Haussknecht, Carl.
Haw.—Haworth, Adrian Hardy.
HBK.—Humboldt, F. Alexander von, Bonpland, Aimé, and Kunth, C. S.
Hegel.—Hegelmaier, Friedrich.
Heist.—Heister, Lorentz.
Herb.—Herbert, William.
Hitchc.—Hitchcock, Albert Spear.
Hoffm.—Hoffmann, Georg Franz.
Hook.—Hooker, William Jackson.
Hook. f.—Hooker, Joseph Dalton.
Hornem.—Hornemann, Jens Wilken.
Huds.—Hudson, William.
Jacq.—Jacquin, Nicolaus Joseph.
J. D. Sm.—Smith, John Donnell.
J. F. Gmel.—Gmelin, Johann Friedrich.
J. G. Gmel.—Gmelin, Johann Georg.
J. G. Sm.—Smith, Jared Gage.
J. Sm.—Smith, John.
Jord.—Jordan, Alexis.
Juss.—Jussieu, Antoine Laurent de.
Juss., B. Juss.—Jussieu, Bernard de.
Karst.—Karsten, Hermann.
Krock.—Krocker, Anton Johann.
Ktze.—Kuntze, Otto.
L.—Linnaeus, Carolus, or Linné, Carl von.
L. f.—Linné, Carl von (the son).
Laestad.—Laestadius, Lars Levi.
Lag.—Lagasca, Mariano.
Lall.—Ave-Lallemant, J. L. E.
Lam.—Lamarck, J. B. A. P. Monnet.
Lamb.—Lambert, Aylmer Bourke.
Lat.—Latourette, M. A. L.
Leavenw.—Leavenworth, Melines C.
Ledeb.—Ledebour, Carl F. von.
Lehm.—Lehmann, J. G. C.
Lesp.& Thév.—Lespinasse, Gustave, and Théveneau, A.
Less.—Lessing, Christian Friedrich.
L'Hér.—L'Héritier de Brutelle, C. L.
Lightf.—Lightfoot, John.
Lindl.—Lindley, John.
Lodd.—Loddiges, Conrad.
Loefl.—Loefling, Pehr.
Loisel.—Loiseleur-Deslongchamps, J L. A.
Loud.—Loudon, John Claudius.
Lour.—Loureiro, Juan.
MacM.—MacMillan, Conway.
Marsh.—Marshall, Humphrey.
Maxim.—Maximowicz, Carl Johann.
Medic.—Medicus, Friedrich Casimir.
Meisn.—Meisner, Carl Friedrich.
Merr.—Merrill, Elmer D.
Mett.—Mettenius, Georg Heinrich
Mey.—Meyer, Ernst Heinrich F.
Mey., C. A. Mey.—Meyer, Carl Anton.
Mey., G. F. W. Mey.—Meyer, Georg Friedrich Wilhelm.
Mich.—Micheli, Pier' Antonio.
Michx.—Michaux, André.
Michx. f.—Michaux, François André.
Mill.—Miller, Philip.
Moq.—Moquin-Tandon, Alfred.
Muell. Arg.—Mueller, Jean (of Aargau).
Muench.—Muenchhausen, Otto Freiherr von.
Muhl.—Muhlenberg, G. H. E.
Murr.—Murray, Johann Andreas.
Neck.—Necker, Noel Joseph de.
Nees—Nees von Esenbeck, Christian Gottfried.
Nees & Eberm.—Nees von Esenbeck, T F. L., and Ebermaier, K. H.
Newm.—Newman, Edward.

Nutt. — Nuttall, Thomas.
Pall. — Pallas, Peter Simon.
Parl. — Parlatore, Filippo.
P. Br. — Browne, Patrick.
Pers. — Persoon, Christian Hendrik.
Peterm. — Petermann, Wilhelm Ludwig.
Planch. — Planchon, Jules Émile.
Plum. — Plumier, Charles.
Poir. — Poiret, Jeau Louis Marie.
Poll. — Pollich, Johann Adam.
R. & P. — Ruiz Lopez, Hipolito, and Pavon, Josef.
R. & S. — Roemer, J. J., and Schultes, August.
Raf. — Rafinesque-Schmaltz, C. S.
R. Br. — Brown, Robert.
Reichenb. — Reichenbach, H. G. L.
Retz. — Retzius, Anders Johan.
Richards. — Richardson, John.
Roem. — Roemer, M. J.
Rostk. — Rostkovius, F. W. G.
Rottb. — Rottboell, Christen Fries.
Rupp. — Ruppius, Heinrich Bernhard.
Rupr. — Ruprecht, Franz J.
Rydb. — Rydberg, Per Axel.
Salisb. — Salisbury, Richard Anthony.
Sarg. — Sargent, Charles Sprague.
Sch. Bip. — Schultz, Karl Heinrich (distinguished as Bipontinus, *i.e.* of Zweibrucken).
Schleich. — Schleicher, J. C.
Schleid. — Schleiden, Matthias Jacob.
Schrad. — Schrader, Heinrich Adolph.
Schreb. — Schreber, Johann D. C. von.
Schwein. — Schweinitz, Lewis David de.
Scop. — Scopoli, Johann Anton.
Scribn. — Lamson-Scribner, Frank.
Ser. — Seringe, Nicolas Charles.
Shuttlw. — Shuttleworth, Robert.
Sibth. — Sibthorp, John.
Sieb. & Zucc. — Siebold, P. F. von, and Zuccarini, J. G.
Sm. — Smith, James Edward.
Sm., J. Sm. — Smith, John.
Sm., J. D. Sm. — Smith, John Donnell
Sm., J. G. Sm. — Smith, Jared Gage.
Soland. — Solander, Daniel.
Spreng. — Sprengel, Kurt.
Sternb. — Sternberg, Caspar.
Steud. — Steudel, Ernst Gottlieb.
Stev. — Steven, Christian.
St. Hil. — St. Hilaire, Auguste de.
Sulliv. — Sullivant, William Starling.
Sw. — Swartz, Olaf.
T. & G. — Torrey, John, and Gray, Asa.
Thunb. — Thunberg, Carl Pehr.
Torr. — Torrey, John.
Tourn. — Tournefort, Joseph Pitton de.
Trel. — Trelease, William.
Trev. — Treviranus, Christian Ludolf.
Trin. — Trinius, Karl Bernhard.
Tuckerm. — Tuckerman, Edward.
Turcz. — Turczaninow, Nicolaus.
Underw. — Underwood, Lucien Marcus.
Vaill. — Vaillant, Sébastien.
Vent. — Ventenat, Étienne Pierre.
Vill. — Villars, Dominique.
Wahlb. — Wahlberg, Pehr Fredrik.
Wahlenb. — Wahlenberg, Georg.
Waldst. & Kit. — Waldstein, F. A. von, and Kitaibel, P.
Wallr. — Wallroth, K. F. W.
Walp. — Walpers, Wilhelm Gerhard.
Walt. — Walter, Thomas.
Wang. — Wangenheim, F. A. J. von.
Wats. — Watson, Sereno.
Wettst. — Wettstein, Richard von.
Willd. — Willdenow, Carl Ludwig.
Wimm. — Wimmer, Friedrich.
With. — Withering, William.
Wormsk. — Wormskiold, M. von.
Wulf. — Wulfen, Franz Xavier.

FURTHER ABBREVIATIONS AND SIGNS EMPLOYED IN THIS WORK

(The customary and well known abbreviations for the states of the Union and months of the year are omitted from this list.)

Adv., adventive, *i.e.* as yet only casual and sporadic.
Afr., Africa.
Alb., Alberta.
Am., America or American.
Assina., Assiniboia.
Austr., Australia.
auth., authors.
B. C., British Columbia.
cm., centimeter (or centimeters), the hundredth part of a meter, = about two-fifths of an inch.
cosmop., cosmopolitan.
distr., distributed.
dm., decimeter (or decimeters), the tenth part of a meter, = about four inches.
e., east or eastern.
eastw., eastward.
Eu., Europe.
Eurasia, Europe and Asia.
f., filius, son, or the younger.
Fl., flowers or flowering.
Fr., fruit or fruiting.
Greenl., Greenland.
Huds. B., Hudson Bay.
I., island.
Introd., introduced, *i.e.* brought in intentionally, as through horticulture, etc.
I. T., Indian Territory.
L., lake.
Lab., Labrador.
L. I., Long Island, New York.
m., meter (or meters), = about $39\frac{1}{3}$ inches.
Man., Manitoba.
Man. ed. 6, Sixth edition or Gray's Manual of Botany.
Mex., Mexico.
mm., millimeter (or millimeters), = about one twenty-fifth of an inch.
mt., *mts.*, mountain, mountains.
n., north or northern.
N. A., North America.
nat., naturalized, *i.e.* thoroughly established.
N. B., New Brunswick.
n. e., northeast.
Nfd., Newfoundland.
no., number.
northw., northward.
N. S., Nova Scotia.
n. w., northwest.
Okla., Oklahoma.
Ont., Ontario.
P. E. I., Prince Edward Island.
Que., Province of Quebec.
R., river.
s., south or southern.
S. A., South America.
Sask., Saskatchewan.
s. e., southeast.
Siber., Siberia.
southw., southward.
Subtrop., sub-tropical.
s. w., southwest.
Temp., temperate.
Trop., tropics or tropical.
w., west or western.
westw., westward.
W. I., West Indies.

μ (pronounced mu). A micron, the millionth part of a meter, a measure used in microscopic studies.
- Figures or words connected by the

short dash indicate the extremes of variation, as "5–12 mm. long, few-many-flowered," *i.e.* varying from five to twelve millimeters in length and from few to many flowered.

§ section.

∞ Of indefinite number, usually many.

! A mark of affirmation or authentication.

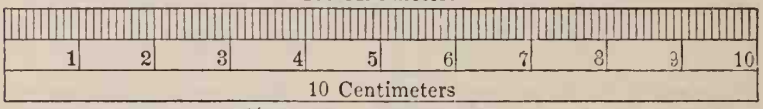
? indicates doubt.

♂ Bearing stamens or antheridia but neither pistils nor archegonia.

♀ Bearing pistils or archegonia but neither stamens nor antheridia.

× crossed with, the sign of a hybrid.

100 Millimeters



1/10 Meter, or 1 Decimeter

DESCRIPTIVE FLORA

Division I. PTERIDÓPHYTA

(Ferns and Fern Allies)

Male generative cells (spermatozoids) spirally coiled motile bodies, not developing into a tube. Plants with more or less distinct alternation of generations. The sexual stage, a small thalloid body; the asexual provided with vascular tissue and (with rare exceptions) differentiated into stem and leaves (fronds), some of these modified to bear asexual reproductive bodies or spores (without embryo), which again give rise to the sexual generation. — Often called Vascular Cryptogams or Higher Flowerless Plants.

HYMENOPHYLLÀCEAE (Filmy Fern Family)

Delicate ferns with slender often filiform creeping rootstocks. Fronds pellucid, of a single layer of cells. Sporangia sessile on a bristle-like receptacle within a cup-shaped, tubular, or bivalvular involucre, from the apex of a vein, the ring transverse and complete. Chiefly tropical, inhabiting damp places, often epiphytic. Fronds circinate in vernation.

1. TRICHÓMANES L. Filmy Fern

Involucre tubular-funnel-shaped, the mouth nearly or quite truncate. Sporangia bursting vertically. — Ours a small creeping fern with much divided fronds. (An ancient Greek name for some fern.)

1. T. Boschiànum Sturm. Fronds oblong-lanceolate, 1–2 dm. long, 12–35 mm. wide, bipinnatifid; rhachis narrowly winged; pinnae triangular-ovate, the divisions toothed or again lobed; capillary receptacle often much exserted. (*T. radicans* Man. ed. 6, not Sw.) — On moist and dripping sandstone cliffs, Ky. to Ala.

POLYPODIÀCEAE (Fern Family)

Leafy plants (ours herbaceous), *with creeping rhizomes. Spores borne in sporangia* (spore-cases), *these collected in dots, lines, or variously shaped clusters* (sori or fruit dots) *on the back or margins of the frond or its divisions, cellular-reticulated, stalked, the stalk running into a vertical incomplete many-jointed ring, which by straightening at maturity ruptures the sporangium transversely on the inner side, discharging the spores. Fruit dots often covered* (at least

when young) *by a membrane called the indusium* (or less properly the *involucre*), *growing either from the back or the margin of the frond.*

a. Indusium none or abortive and obscure *b.*
 b. Sterile fronds simply pinnatifid (the segments rarely toothed or lobed).
  Fertile fronds similar to the sterile, flat and leaf-like . . . . 1. POLYPODIUM.
  Fertile fronds much contracted; segments pod-like . . . . 18. ONOCLEA.
 b. Sterile fronds 2–4-pinnate or -pinnatifid.
  Sterile fronds green on both surfaces.
   Fertile fronds similar to the sterile, leaf-like . . . . . 2. PHEGOPTERIS.
   Fertile fronds much contracted; segments pod-like . . . 18. ONOCLEA.
  Sterile fronds whitened beneath . . . . . 3. NOTHOLAENA.
a. Indusium present *c.*
 c. Indusium formed entirely or in part by the revolute edge of the frond *d.*
  d. Sori clearly distinct.
   Indusium single, covering the sorus . . . . . 4. ADIANTUM.
   Indusium double, cup-like or 2-valved . . . . . 17. DICKSONIA.
  d. Sori soon confluent as a more or less continuous marginal band.
   Stipe stout (3–4 mm. in diam.), commonly solitary . . . . . 5. PTERIS.
   Stipes filiform (0.5–1.3 mm. in diam.), clustered.
    Segments of the sterile frond glabrous.
     Green or greenish.
      Segments petiolulate or articulated at cordate or rounded base 7. PELLAEA.
      Segments of sterile frond cuneate at sessile unarticulated base 8. CRYPTOGRAMMA.
     Chalky-white beneath . . . . . 3. NOTHOLAENA.
    Segments of the sterile frond pubescent . . . . . 6. CHEILANTHES.
 c. Indusium not continuous with the edge of the frond *e.*
  e. Indusium peltate or laterally attached, covering the sorus when young *f.*
   f. Sori more or less elongated.
    Sori parallel to the midrib. . . . . 9. WOODWARDIA.
    Sori parallel to the oblique lateral veins.
     Veins free; fronds 1–3-pinnate.
      Sori separate, straight or horseshoe-shaped . . . . . 10. ASPLENIUM.
      Sori linear, confluent in pairs (appearing like single sori but with indusia on both sides) . . . . . 11. SCOLOPENDRIUM.
     Veins reticulated; fronds simple, rooting at the tip . . . 12. CAMPTOSORUS.
   f. Sori orbicular or reniform *g.*
    g. Indusium evident at least when young; fertile fronds leaf like *h.*
     h. Indusium fixed by the center.
      Indusium orbicular-peltate, without a sinus . . . . . 13. POLYSTICHUM.
      Indusium reniform or if orbicular with a narrow sinus . . 14. ASPIDIUM.
     h. Indusium attached at the side . . . . . 15. CYSTOPTERIS.
    g. Indusium obscure, lunate; fertile segments much contracted, pod-like . . . . . 18. ONOCLEA.
  e. Indusium inferior, cup-like or involucre-like.
   Indusium 2-valved, cup-like . . . . . 17. DICKSONIA.
   Indusium cleft into narrow segments . . . . . 16. WOODSIA.

1. POLYPÒDIUM [Tourn.] L. POLYPODY

Fruit dots round, naked, arranged on the back of the frond in one or more rows each side of the midrib or central vein, or irregularly scattered, each borne in our species on the end of a free veinlet. Rootstocks creeping, branched, often covered with chaffy scales, bearing scattered roundish knobs, to which the stipes are attached by a distinct articulation. (Name from πολύ-, *many*, and πούς, *foot*, alluding to the branching rootstock.)

1. **P. vulgàre** L. Fronds evergreen, oblong, *smooth both sides*, 8–40 cm high, simple and deeply pinnatifid; the divisions linear-oblong, obtuse or somewhat acute, remotely and obscurely toothed; veins once or twice forked; *fruit dots large, midway between the midrib and the margin.* — Rocks; common. July. (Eu., etc.) Variable. Some of the more noteworthy forms have been distinguished as: Var. ATTENUÀTUM Milde, with segments attenuate-acuminate, serrulate toward the end. Var. AURÌTUM Willd., with the lowest segments auricled. Var. CÁMBRICUM (L.) Willd., with the segments more or less strongly toothed or pinnatifid. Var CRISTÀTUM Moore, with segments 1–several times forked at the ends.

2. **P. polypodioìdes** (L.) Hitchc. Frond evergreen and coriaceous, oblong, 6–25 cm. high, *grayish and very scurfy underneath with peltate scales*, simply pinnatifid; the divisions oblong-linear, obtuse; *fruit dots rather small, near the margin;* veins forking, free in the N. American plant! (*P. incanum* Sw.) — Rocks and trunks of trees, Va. and O. to Ia., and southw.; reported on Staten I., N. Y. (Trop.)

2. PHEGÓPTERIS (Presl) Fée. Beech Fern

Fruit dots small, round, naked (no indusium), borne on the back of the veins below the apex. Stipe continuous with the rootstock. — Our species have free veins and bright green membranaceous fronds, decaying in early autumn. (Name composed of φηγός, an *oak* or *beech*, and πτέρις, *fern.*)

* *Fronds twice pinnatifid; pinnae all sessile, adnate to the winged rhachis.*

1. **P. polypodioìdes** Fée. Fronds triangular, *longer than broad* (8–26 cm. long), hairy on the veins, especially beneath; pinnae linear-lanceolate, *the lowest pair deflexed and standing forward;* their divisions oblong, obtuse, entire, the basal decurrent upon the main rhachis; fruit dots all near the margin. (*P. Phegopteris* Underw.) — Damp woods, Nfd. to N. Y., "Va.," Wisc., Ia., Wash., and Alaska. (Eurasia.)

2. **P. hexagonóptera** (Michx.) Fée. Fronds triangular, *usually broader than long* (14–30 cm. broad), slightly pubescent and often finely glandular beneath: pinnae lanceolate; upper segments oblong, obtuse, toothed or entire, *those of the very large lowest pinnae often elongated and pinnately lobed*, basal ones very much decurrent and forming a continuous many-angled wing along the main rhachis; fruit dots near the margin; some also between the sinus and the midrib. — Rather open woods, centr. Me. to w. Que., w. to Minn., and southw.; common. — Larger and broader than the last, which it often closely resembles.

* * *Fronds ternate, the three divisions petioled; rhachis wingless.*

3. **P. Dryópteris** (L.) Fée. (Oak Fern.) *Fronds smooth*, broadly triangular (1–1.5 dm. wide), the three triangular primary divisions *all widely spreading*, 1–2-pinnate; segments oblong, obtuse, entire or toothed; fruit dots near the margin. — Rocky woods; common northw. (Eurasia.)

4. **P. Robertiàna** (Hoffm.) A. Br. *Fronds minutely glandular* and somewhat rigid, dull green; lowest inferior pinnae of the lateral divisions smaller in proportion than in the last species. (*P. calcarea* Fée.) — Shaded limestone, "Lab." and Anticosti to N. B., Ia., and Man.; rare. (Eu.)

3. NOTHOLAÈNA R. Br. Cloak Fern

Fruit dots roundish or oblong, placed near the ends of the veins, soon more or less confluent into an irregular marginal band, with no proper involucre. Veins always free. Fronds of small size, 1–4-pinnate, the lower surface almost always either hairy, tomentose, chaffy, or covered with a fine waxy white or yellow powder. (Name from νόθος, *spurious*, and λαῖνα, *a cloak*, the woolly coating of the original species forming a spurious covering to the sporangia.)

1. **N. dealbàta** (Pursh) Kunze. Fronds triangular-ovate, 3–8 cm. long, 3–4-pinnate; rhachis and branches straight, black and shining; ultimate pinnules ovate-oblong, scarcely 2 mm. long, white and powdery on the lower surface. (*N. nivea*, var. Davenp.) — Clefts of dry calcareous rocks, Mo., Kan., and southwestw. July, August.

4. ADIÁNTUM [Tourn.] L. Maidenhair

Fruit dots marginal, short, borne on the under side of a transversely oblong, crescent-shaped or roundish, more or less altered margin of a lobe of the frond reflexed to form an indusium; the sporangia attached to the approximated tips of the free forking veins. — Main rib (costa) of the pinnules none (in our species) or at the lower margin. Stipes black and polished. (The ancient name, from α- privative and διαίνω, meaning *unwetted*, the foliage repelling rain-drops.)

1. **A. pedàtum** L. *Frond forked at the summit of the upright slender stalk* (2–5 dm. high), the recurved branches bearing on one side several slender spreading pinnate divisions; pinnules numerous, short-stalked and obliquely triangular-oblong, entire on the lower margin, from which the vines all proceed, and cleft and fruit-bearing on the other. — Rich moist woods. July.

2. A. Capíllus-Véneris L. *Fronds* (1–5 dm. high) *with a continuous main rhachis, ovate-lanceolate*, often pendent, 2–3-pinnate at the base, the upper third or half simply pinnate; pinnules wedge-obovate or rhomboid, 15–32 mm. long, deeply and irregularly incised; veinlets flabellately forking from the base; involucres lunulate or transversely oblong. — Moist rocky places, s. N. Y. (?); s.e. Pa. to Ky. and Fla.: also S. Dak. and southwestw. (Widely distr.)

5. PTÈRIS L. Brake or Bracken

Sporangia in a continuous slender line of fructification, occupying the entire margin of the fertile frond, and covered by its reflexed narrow edge which forms a continuous membranaceous indusium, attached to an uninterrupted transverse vein-like receptacle connecting the tips of the forked free veins, with or without an obscure inner indusium. Fronds 1–3-pinnate or decompound. (The ancient Greek name of Ferns, from πτερόν, *a wing*, on account of the prevalent pinnate or feathery fronds.)

1. P. aquilina L. (Common Brake.) Frond dull green (2–9 dm. wide), ternate at the summit of an erect stout stalk (2–9 dm. high), the widely spreading branches twice pinnate; *pinnules oblong-lanceolate;* the upper undivided; the lower more or less pinnatifid, with oblong obtuse lobes, margined all round with the indusium, which is really double in this species. (*Pteridium* Kuhn.) — Thickets and hillsides, common. Aug. (Widely distr.) Var. pseudocaudàta Clute is a form with many of the *pinnules*, especially the terminal ones, narrow, entire, and *much elongated*. — Mass. to N. J., southw. to Fla. and Tex.

6. CHEILÁNTHES Sw.

Sporangia borne on the thickened ends of free veinlets, forming small and roundish distinct or nearly contiguous marginal fruit dots, covered by a mostly whitish and membranaceous, sometimes herbaceous, common indusium, formed of the reflexed margin of separate lobes or of the whole pinnule. — Low, mostly with 2–3-pinnate and hairy or chaffy, rarely smooth fronds, the sterile and fertile nearly alike, the divisions with the principal vein central. Some species with continuous indusium connect this genus very closely with the next. (Name composed of χεῖλος, *margin*, and ἄνθος, *a flower*, from the marginal sori.)

* *Fronds smooth, or at most hairy.*

1. C. alabaménsis (Buckley) Kunze. *Fronds smooth*, chartaceous (7–20 cm. long), ovate-lanceolate, bipinnate; pinnae numerous, oblong-lanceolate; pinnules triangular-oblong, rather acute, often auriculate or lobed; *indusium continuous, rather broad, pale, and of firm consistence.* — On rocks, mts. of Va. to Ky., southw. and westw. (Mex.)

2. C. lanòsa (Michx.) Watt. *Fronds* (1–4 dm. high) lanceolate-oblong, *hirsute*, as are the brown and shining stipes, with *straightish prominently articulated rusty hairs*, twice pinnate; pinnae rather distant, triangular-ovate; pinnules oblong, crowded (4–8 mm. long), more or less incised, *the ends of the roundish or oblong lobes reflexed and forming separate herbaceous involucres*, which are pushed back by the ripened sporangia. (*C. vestita* Sw.) — Clefts of rocks, Ct. to Minn., Wyo., and southw.

** *Fronds woolly or tomentose.*

3. C. tomentòsa Link. Fronds (1.5–5 dm. high) lanceolate-oblong, densely tomentose with *slender and entangled whitish obscurely articulated hairs*, thrice pinnate; primary and secondary pinnae oblong or ovate-oblong; *pinnules distinct*, minute (1–2 mm. long), roundish-obovate, sessile or adnate-decurrent, the upper surface less woolly, *the reflexed narrow margin forming a continuous somewhat membranaceous indusium.* — Mts. of Va. and Ky.; thence w. and southw. — Stipe and rhachis rather stout, brown, covered with narrow chaffy scales and whitish hairs. (Mex., W. I.)

4. C. Feèi Moore. Stipes slender, at first hairy, black or brown, shining;

fronds (8–17 cm. high) ovate-lanceolate, woolly with *soft whitish distinctly articulated flattened hairs*, becoming smoother above, twice or thrice pinnate; pinnae (8–12 mm. long) ovate, the lowest distant, the others contiguous; *pinnules crenately pinnatifid*, or mostly divided into minute and roundish densely crowded segments (1–2 mm. long), *the herbaceous margin recurved and forming an almost continuous indusium.* (*C. lanuginosa* Nutt.) — In dense tufts, on dry rocks and cliffs, Ill. to Minn., thence w. and southw.

7. PELLAÈA Link. Cliff Brake

Sporangia in roundish or elongated clusters on the upper part of the free veins, distinct, or confluent laterally so as to imitate the marginal continuous line of fructification of *Pteris*, commonly covered by a broad membranaceous and continuous (rarely interrupted) general indusium, which consists of the reflexed and altered margin of the fertile pinnule or division. — Small ferns, with 1–3-pinnate fronds, the fertile ones with narrower divisions than the sterile, but otherwise similar. Stipes generally dark-colored, smooth, and shining. (Name from πελλός, *dusky*, alluding to the stipe.)

1. **P. atropurpùrea** (L.) Link. Smooth, except some bristly-chaffy hairs on the midribs and especially on the *dark purple and polished stalk* and rhachis, 1–6 dm. high; *fronds coriaceous*, pale, once or below twice pinnate; the divisions broadly linear or oblong, or the sterile sometimes oval, chiefly entire, somewhat heart-shaped or else truncate at the stalked base; veins about twice forked. — Dry calcareous rocks, "N. H." and Vt. to R. I., Ga., and westw.; not common. July. Var. cristàta Trel. is a form with dichotomously forked pinnae, somewhat crowded toward the summit of the frond. — Eureka, Mo. (*G. Pauls*).

8. CRYPTOGRÁMMA R. Br. Rock Brake

Fruit dots roundish or elongated and extending far down on the free forking veins. Margins of the fertile segments herbaceous or more or less scarious, at first reflexed and meeting at the midrib, at length opening out flat and exposing the confluent sporangia. — Low ferns, with smooth 2–3-pinnate tufted fronds, the fertile ones taller than the sterile, and with narrower divisions. (Name from κρυπτός, *hidden*, and γραμμή, *a line*, alluding to the lines of sporangia at first concealed by the reflexed margin.)

* *Revolute margins of the fertile frond bearing a distinct scarious indusial border; ultimate segments of the sterile fronds lance-linear, acute.*

1. **C. dénsa** (Brack.) Diels. Fronds not very dissimilar, 8–20 cm. high; stipes purplish brown; *segments* of the sterile fronds *lance-linear, very acute*, incisely serrate. (*Pellaea* Hook.) — Calcareous or serpentine walls of ravines, etc., Mt. Albert, Gaspé Co., Que.; Grey Co., Ont.; and in the far west.

* * *Revolute margins of the fertile frond scarcely modified; ultimate segments of the sterile fronds broader.*

2. **C. acrostichoìdes** R. Br. Fronds markedly dissimilar; *segments* of the fertile linear (6–10 mm. long), *of the sterile ovate-oblong, obtuse*, serrulate; stipes straw-colored, scaly especially toward the base. — Crevices of rocks, Arctic Am. to L. Huron, L. Superior, Col., and Cal.

3. **C. Stellèri** (Gmel.) Prantl. Fronds markedly dissimilar; *segments* of the fertile linear-oblong to lance-linear; those *of the sterile ovate to obovate-flabelliform*, crenulate, decurrent at their cuneate bases. (*Pellaea gracilis* Hook.) — Shaded chiefly calcareous rocks, Que. and N. B. to Vt., Ct., n. Pa., Ill., and northwestw.; local. (Asia.)

9. WOODWARDIA Sm. Chain Fern

Fruit dots oblong or linear, arranged in one or more chain-like rows on transverse anastomosing veinlets parallel and near to the midrib. Indusium fixed by

its outer margin to the fruitful veinlet, free and opening on the side next the midrib. Veins more or less reticulated, free toward the margin of the frond. — Large ferns, with pinnatifid or pinnate fronds. (Named for *Thomas J. Woodward*, an English botanist.)

§ 1. ANCHISTÈA (Presl) Hook. *Sterile and fertile fronds alike; veins forming only one row of meshes (areoles).*

1. **W. virgínica** (L.) Sm. Fronds (6–14 dm. high) pinnate, with numerous lanceolate pinnatifid pinnae; segments oblong; veins forming a row of narrow areoles along the midrib both of the pinnae and of the lobes, the outer veinlets free; fruit dots oblong, one to each areole, confluent when ripe. — Wet swamps, N. S. to Fla., La., Mich., and Ont. Rootstocks creeping, often 2–3 m. long! July.

§ 2. LORINSÈRIA (Presl) Hook. *Sterile and fertile fronds unlike; veins of the sterile fronds forming many rows of meshes.*

2. **W. areolàta** (L.) Moore. Fronds pinnatifid; sterile ones (2–6 dm. high) with lanceolate serrulate divisions united by a broad wing; fertile fronds taller, with narrowly linear almost disconnected divisions, the areoles and fruit dots (8–10 mm. long) in a single row each side of the secondary midrib; rootstocks creeping. (*W. angustifolia* Sm.) — Wet woods, s. Me. to Fla. and Tex.; also Ark. and Mich.; rare. Aug., Sept.

10. ASPLÈNIUM L. Spleenwort

Fruit dots oblong or linear, oblique, separate; the straight or rarely curved indusium fixed lengthwise by one edge to the upper (inner) side of the fertile vein; — in some species a part of the fruit dots are double, the fertile vein bearing two indusia placed back to back. Veins free in all our species. (Name from α- privative and σπλήν, *the spleen*, for supposed remedial properties.)

§ 1. EUASPLÈNIUM (Endl.) Klotzsch. *Indusium straight or slightly curved, attached to the upper side of the vein, rarely double; small evergreen ferns; stipes filiform or nearly so, with vascular bundles separate and peripheral or if united toward the summit forming a lunate bundle; scales of the rhizome and stipes narrow, of firm texture and with thick-walled cells.*

* *Fronds pinnatifid, or pinnate only near the base.*

1. **A. pinnatífidum** Nutt. *Fronds* (7–20 cm. long) lanceolate, *pinnatifid or pinnate below, tapering above into a slender prolongation,* "the apex sometimes rooting"; *lobes roundish-ovate, obtuse, or the lowest long-acuminate;* fruit dots irregular, those next the midrib often double, even the slender prolongation fertile; *stipes brownish, becoming green above, and so passing into the broad pale green midrib.* — On cliffs and rocks, Ct. to Mo., and southw.; very rare. July. — Resembles the Walking Leaf (*Camptosorus*), but the veins are free.

× **A. ebenoìdes** R. R. Scott. *Fronds* (1–2 dm. high) broadly lanceolate, *pinnatifid, below pinnate, the apex prolonged and slender; divisions lanceolate from a broad base, the lower ones shorter,* often proliferous, as is the apex of the frond; fruit dots much as in the last; *stipes black and polished, as is the lower part of the midrib, especially beneath.* — Limestone cliffs, Vt. (*Miss Woolson, Miss Smith*) to Mo., and southw.; very rare. A noteworthy hybrid between *A. platyneuron* and *Camptosorus rhizophyllus;* its origin early suspected by *M. G. Berkeley* and recently demonstrated by *Miss Margaret Slosson.* This fern is more abundant and probably self-perpetuating in Ala.

** *Fronds narrow, linear-oblong to oblong-lanceolate, pinnate, with numerous pinnae; these entire to serrate or rarely incised.*

+ *Pinnae not auricled.*

2. **A. víride** Huds. *Fronds* (5–13 cm. tall) tufted, *linear in outline, pale green, softly herbaceous; pinnae roundish-ovate or ovate-rhomboid,* short-stalked, crenately toothed (4–9 mm. long), the midvein indistinct and forking;

the slender stipe brownish and passing into a green herbaceous rhachis. — Shaded limestone; Nfd. to n. N. E., w. and northw; rare. (Widely distr.)

3. **A. Trichómanes** L. *Fronds* (8–22 cm. long) in dense spreading tufts, *linear in outline, dark green and more rigid; pinnae roundish-oblong or oval* (3–7 mm. long), entire or crenulate, rarely incised, unequal-sided, obliquely wedge-truncate at base, attached by a narrow point, the midvein forking and evanescent; *the thread-like stipe and rhachis purple-brown and shining.* — Shaded rocks. July. (Widely distr.) Forma INCÌSUM Moore with deeply pinnatifid pinnae has been reported from Vt. (*Miss Grout, Mrs. Horton*).

+ + *Pinnae more or less auricled.*

4. **A. párvulum** Mart. & Gal. Fronds upright (1–25 dm. high), narrowly linear-oblanceolate; *pinnae* (4–12 mm. long) *rigid and thickish, mostly opposite,* nearly sessile, somewhat deflexed, oblong, obtuse, *entire or crenulate,* auricled on the upper or both sides; sori rather few, as near the margin as to the continuous midvein; stipe and rhachis black and shining. (*A. resiliens* Kunze.) — Mts. of Va. to Kan., and southw. — Intermediate between the last and the next.

5. **A. platyneùron** (L.) Oakes. Fronds upright (2–5 dm. tall), linear-oblanceolate in outline, fertile ones much the taller; *pinnae* (1–3 cm. long) *firmly membranaceous, mostly alternate,* sessile, spreading, oblong or oblong-linear, *finely serrate or even incised,* the base auricled on the upper or both sides; sori many, nearer the elongated midvein than the margin; stipe and rhachis blackish-purple and shining. (*A. ebeneum* Ait.) — Rocky open woods, s. Me. to Col., and southw. (W. I., S. Am., Afr.) Var. SERRÀTUM (E. S. Miller) BSP. is a form with at least some of the pinnae deeply jagged-serrate. Var. INCÌSUM (E. C. Howe) Robinson has very brittle stipes and the pinnae deeply pinnatifid. (*A. ebeneum,* var. *Hortonae* Davenp.) — Vt. to Md., Mo., and "Ark."; rare.

6. **A. Bradlèyi** D. C. Eaton. *Fronds oblong-lanceolate* (4–20 cm. tall); stipe blackish and somewhat shining; pinnae membranaceous, rather numerous, *the lower ones no larger than the middle ones,* all short-stalked, *oblong-ovate,* obtuse, *incised or pinnatifid into oblong toothed lobes.* — On rocks, e. N. Y. to Ky., "Mo.," and southw.; rare.

* * * *Fronds ovate-lanceolate to deltoid, 2–3-pinnate or -pinnatifid.*

7. **A. montànum** Willd. *Fronds ovate-lanceolate from a broad base* (5–13 cm. long), subcoriaceous, pinnate; pinnae ovate-oblong, the lowest pinnately cleft into *oblong or ovate* cut-toothed *lobes,* the upper gradually simpler; *rhachis green, broad and flat; stipe brown at base.* — Cliffs and rocks, from Ct. to O., Ky., "Ark.," and southw. July.

8. **A. Rùta-murària** L. *Fronds deltoid-ovate* (3–7 cm. long exclusive of the green stipe), subcoriaceous, laxly 2–3-pinnate at base, the pinnae alternate; *ultimate segments few,* stalked (3–14 mm. long), *from narrowly cuneate to roundish-obovate,* toothed or incised at the apex; veins forking; sori 2–4 on a segment; *rhachis and stipe green.* — Limestone cliffs, Vt. to Ont., Mich., Mo., and southw.; scarce. July. (Eurasia.)

§ 2. ATHÝRIUM (Roth) J. Sm. *Indusium straight or more often curved, frequently crossing the vein; fronds tall, strictly herbaceous; the stipes green or greenish not filiform, the bundles concentric and uniting above into a 3–4-armed central bundle; scales delicate, of thin-walled cells.* — *Athyrium* Roth as redefined by Milde.

* *Fronds simply pinnate; indusium straight or but slightly curved.*

9. **A. angustifòlium** Michx. Fronds 6–12 dm. high; *pinnae* (8–12 cm. long) numerous, short-stalked, *linear-lanceolate, acuminate,* entire or crenulate, *those of the fertile frond narrower;* fruit dots linear, 20–40 each side of the midvein; indusia slightly convex. (*Athyrium* Milde.) — Rich woods, w. Que. and N. H. to Minn., and southw. Sept.

* * *Fronds bipinnatifid; indusium straight or slightly curved.*

10. **A. acrostichoìdes** Sw. *Fronds* (6–11 dm. high) *pinnate; pinnae deeply*

pinnatifid, linear-lanceolate (7–13 cm. long); the lobes oblong, obtuse, minutely toothed, crowded, each bearing 3–6 pairs of *oblong fruit dots*, some of them double. (*A. thelypteroides* Michx.; *Athyrium acrostichoides* Diels.) — Rich woods, N. S. to Ga., Ala., and Minn.; not rare. (Asia.)

* * * *Fronds bipinnate; indusia at least in part reniform or horseshoe-shaped.*

11. A. Filix-fémina (L.) Bernh. (Lady Fern.) Fronds (4–10 dm. high) ovate-oblong or broadly lanceolate, twice pinnate; pinnae lanceolate, numerous; pinnules confluent on the secondary rhachis by a narrow margin, oblong and doubly serrate, or elongated and pinnately incised with cut-toothed segments; fruit dots short, variously curved, at length confluent. (*Athyrium* Roth.) — Moist woods; common and presenting many varying forms. July. (Cosmop.)

11. SCOLOPÉNDRIUM Adans. Hart's Tongue

Fruit dots linear, elongated, almost at right angles to the midrib, contiguous by twos, one on the upper side of one veinlet, and the next on the lower side of the next superior veinlet, thus appearing to have a double indusium opening along the middle. (The ancient Greek name, employed because the numerous parallel lines of fruit resemble the feet of the centipede, or *Scolopendra*.)

1. S. vulgàre Sm. Frond oblong-lanceolate from an auricled-heart-shaped base, entire or wavy-margined (12–45 cm. long, 2–6 cm. broad), bright green. (*Phyllitis Scolopendrium* Newm.) — Shaded ravines and under limestone cliffs; Woodstock, N. B.; Grey and Bruce Cos., Ont.; centr. N. Y.; and Tenn.; very rare. Aug. (Mex., Eurasia.)

12. CAMPTOSÒRUS Link. Walking Leaf

Fruit dots oblong or linear, as in *Asplenium*, but irregularly scattered on either side of the *reticulated veins* of the simple frond, those next the midrib single, the outer ones inclined to approximate in pairs (so that their two indusia open face to face) or to become confluent at their ends, thus forming crooked lines (whence the name, from καμπτός, *flexible*, and σωρός, for *fruit dot*).

1. C. rhizophýllus (L.) Link. Fronds evergreen, subcoriaceous, growing in tufts, spreading or procumbent (1–3 dm. long), gradually narrowed from a cordate or auricled base to a long and slender acumination, which often roots at the end and forms a new plant. — Shaded, especially calcareous rocks; centr. Me. to Ottawa, thence to Minn., and southw. to Kan. and Ga. — The auricles are sometimes greatly elongated, and even rooting; in another form they are lacking.

13. POLÝSTICHUM Roth

Fronds tufted at the end of a stout rootstock, chiefly of firm or leathery texture, evergreen; stipes and rhachises chaffy. Sori orbicular, opening on all sides of the circular peltate centrally attached indusium. (Name from πολύ-, many, and στίχος, row, the sori of some species being in many ranks.)

* *Fronds narrowly oblong or lanceolate, simply pinnate, the pinnae sometimes again cleft.*

← *Upper (spore-bearing) pinnae of the fertile fronds much contracted.*

1. P. acrostichoides (Michx.) Schott. (Christmas Fern.) Fronds 2–5 dm. long, the scaly stipe 5–15 cm. in length; *pinnae linear-lanceolate, half-halberd-shaped* at the slightly stalked base, serrulate with appressed bristly teeth; the smaller upper pinnae bearing two rows of sori, which in age becoming confluent cover their entire lower surface. (*Aspidium* Sw.) — Common in rocky woods. Var. Schweinítzii (Beck) Small (*Aspidium acrostichoides*, var. *incisum* Gray) is a variable form with larger fronds, toothed or pinnatifid pinnae, the fertile less reduced and the sori less confluent, chiefly near the tips of the pinnae. — Not rare

← ← *Upper (spore-bearing) pinnae similar to the others.*

2. P. Lonchìtis (L.) Roth. (Holly Fern.) *Fronds linear-lanceolate*, very

short-stalked, rigid (1–6 dm. long); *pinnae broadly lanceolate-scythe-shaped, acute, the lowest short-triangular*, strongly auricled on the upper side, *spinulose-dentate;* sori biseriate, at length subconfluent. (*Aspidium* Sw.) — Rocky (calcareous) woods, Gulf of St. Lawrence; and from Niagara Falls, Ont., to L. Superior, westw. and northw. (Eu.)

* * *Fronds bipinnate.*

3. **P. Braúnii** (Spenner) Fée. *Fronds ovate- or oblong-lanceolate* (4–9 dm. long) tapering to a very short-stiped base; pinnules ovate or oblong, obtuse, truncate and almost rectangular at base, short-stalked, or the upper confluent, sharply toothed, beset with long and soft as well as chaffy hairs. (*Aspidium aculeatum*, var. Döll.) — Rich, mostly upland woods, Nfd. to N. Y., and L. Superior. (Eu.)

14. ASPÍDIUM Sw. Shield Fern. Wood Fern

Fronds tufted, 1–3-pinnate; veins simple or branched. Sori orbicular, borne on the back of the scarcely modified fertile frond. Indusium reniform or, if orbicular, exhibiting a distinct narrow depression or sinus at one side, although centrally attached. Stipes not articulated at the base. (Name from ἀσπίδιον, a small shield, from the shape of the indusium.) Nephrodium Rich.

a. Veins simple or once forked; fronds not evergreen; stipes and slender rootstocks nearly naked.
  Lowest pinnae scarcely smaller than the middle ones.
    Fertile veins once forked . . . . . 1. *A. Thelypteris.*
    Fertile veins simple . . . . . 2. *A. simulatum.*
  Lower pinnae gradually decreasing in size, the lowest very small . 3. *A. noveboracense*
a. Veins, at least the lowest, more than once forked; fronds mostly evergreen; stipes and rootstocks scaly *b.*
  b. Pinnae 40–60, small, 4–8 mm. broad . . . . . 4 *A. fragrans.*
  b. Pinnae fewer, 12–90 mm. broad *c.*
    c. Frond bipinnatifid or bipinnate (or sub-tripinnatifid near the base).
      Sori marginal . . . . . 5. *A. marginale.*
      Sori not marginal.
        Basal scales lance-linear, caudate-attenuate . . . . . 6. *A. Filix-mas.*
        Basal scales ovate-oblong to deltoid.
          Basal scales firm, shining, dark chestnut-colored . . 7. *A. Goldianum.*
          Basal scales thin, dull, membranous, light brown.
            Indusium glandular-pubernlent.
              Lobes of frond with incurved teeth; sori 1.5–1.8 mm. in diameter . . . . . (9) *A. cristatum*, var. *Clintonianum.*
              Lobes with spreading teeth; sori 1–1.2 mm. in diameter. 8. *A. Boottii.*
            Indusium glabrous.
              Frond conspicuously narrowed at the base . . . 9. *A. cristatum.*
              Frond scarcely or not at all narrowed at the base.
                Lobes incurved-serrate . . . . (9) *A. cristatum*, var. *Clintonianum.*
                Lobes spinulose-dentate . . . . . 10. *A. spinulosum.*
    c. Fronds tripinnate or tripinnatifid *d.*
      d. Fronds tripinnatifid.
        Basal scales large, lance-oblong, dark brown (10) *A. spinulosum*, var. *dilatatum.*
        Basal scales small, deltoid-ovate, light brown.
          Indusium glandless . . . . . (10) *A. spinulosum.*
          Indusium glandular-pubernlent . . (10) *A. spinulosum*, var. *intermedium.*
      d. Fronds tripinnate . . . . . (10) *A. spinolusum*, var. *concordianum.*

1. **A. Thelýpteris** (L.) Sw. Fronds pinnate, lanceolate in outline; pinnae horizontal or slightly recurved, linear-lanceolate, deeply pinnatifid; lobes oblong, entire, obtuse or appearing acute when in fruit from the *strongly revolute margins; veins forked*, bearing the (numerous and soon confluent) fruit dots near their middle; indusium minute, smooth and naked. (*Nephrodium* Strempel; *Dryopteris* Gray.) — Marshes; common. Aug. (Cosmop.) Forma Pufferae (A. A. Eaton) Robinson is a form with pinnae variously forked at the tip.

2. **A. simulàtum** Davenp. In habit similar to the preceding; *veins simple;* fruit dots few (3–10 on each lobe); indusium glandular-ciliolate. (*Dryopteris* Davenp.) — Boggy woods, etc., Me. to Vt. and Md.; reported from Mo.

3. **A. noveboracénse** (L.) Sw. Fronds pinnate, lanceolate in outline, *tapering both ways from the middle;* pinnae lanceolate, *the lowest 2 or more pairs*

gradually shorter and deflexed; lobes flat, oblong, basal ones often enlarged and incised; *veins simple*, or forked in the basal lobes; fruit dots distinct, near the margin; indusium minute, the margin glanduliferous. (*Dryopteris* Gray.) — Rich woods; common. July. — Frond pale green, delicate and membranaceous, hairy beneath along the midribs and veins.

4. **A. fràgrans** (L.) Sw. *Fronds* (1–3.5 dm. high) *glandular and aromatic*, narrowly lanceolate, with linear-oblong pinnately-parted pinnae; their *crowded divisions* (2–4 mm. long) oblong, obtuse, toothed or almost entire, *nearly covered beneath with the very large thin imbricated indusia*, which are orbicular with a narrow sinus, the margin sparingly glanduliferous and often ragged. (*Nephrodium* Richards.; *Dryopteris* Schott.) — Chiefly on limestone cliffs, N. B., and n. N. E. to Minn., Alaska, and Greenl. (Caucasus, Asia.)

5. **A. marginàle** (L.) Sw. Frond evergreen, smooth, thickish and almost coriaceous, ovate-oblong in outline (3–7 dm. long); pinnae lanceolate, acuminate, slightly broadest above the base; pinnules oblong or oblong-scythe-shaped, crowded, obtuse or pointed, entire or crenate; *fruit dots close to the margin.* (*Nephrodium* Michx.; *Dryopteris* Gray.) — Rocky hillsides in rich woods; common, especially northw. Aug. Var. ÉLEGANS J. Robinson is a form with large fronds (2–2.5 dm. broad) which have the pinnules or most of them toothed or lobed.

6. **A. Filix-más** (L.) Sw. Frond lanceolate (3–11 dm. long); pinnae linear-lanceolate, tapering from base to apex; pinnules oblong, very obtuse, serrate at the apex and obscurely so at the sides, the basal incisely lobed, distinct, the upper confluent; *fruit dots nearer the midvein than the margin*, usually confined to the lower half of each fertile pinnule. (*Dryopteris* Schott.) — Rocky woods, Nfd., N. S., n. Vt., L. Huron, L. Superior, Dak., Ariz., and northw. (Cosmop.)

7. **A. Goldiànum** Hook. *Frond broadly ovate*, or the fertile ovate-oblong (6–10 dm. long); pinnae (1.5–2.3 dm. long) oblong-lanceolate, *broadest in the middle*, pinnately parted; the *divisions* (*about* 20 *pairs*) *oblong-linear, slightly scythe-shaped* (2–3 cm. long), serrate with appressed teeth; veins pinnately forking and bearing the *fruit dots very near the midvein;* indusium very large, orbicular, with a deep narrow sinus, smooth and without marginal glands. (*Nephrodium* Hook. & Grev.; *Dryopteris* Gray.) — Rich woods, centr. Me. to Minn., Ia., and N. Car.

Var. **célsum** (Palmer) Robinson. Fronds more narrowly ovate-oblong, slightly firmer, the lowest pinnae on rather long stalks; *pinnules subremote.* (*Dryopteris Goldieana*, subsp. Palmer.) — On cypress knees and decaying logs, Dismal Swamp, Va. (*Palmer*).

8. **A. Boóttii** Tuckerm. *Scales* of the stipe *pale-brown;* fronds (4–6.5 dm. long) elongated-lanceolate in outline, somewhat narrowed at base; lowest pinnae triangular-ovate, the upper longer and narrower; pinnules oblong-ovate, sharply spinulose-serrate or the lower pinnatifid; *indusium minutely glandular.* (*Nephrodium* Davenp.; *Dryopteris* Underw.) — Low wet thickets, etc. — Many differing forms have been referred to this species. Plants corresponding to the original material have been seen only from N. H., e. Mass., Ct., and e. Pa. They are suspiciously intermediate between *A. cristatum* and *A. spinulosum*, var. *intermedium.*

9. **A. cristàtum** (L.) Sw. *Frond linear-oblong or lanceolate in outline* (3–6 dm. long); pinnae (5–8 cm. long) *triangular-oblong*, or the lowest nearly triangular-ovate, from a somewhat heart-shaped base, acute, deeply pinnatifid; the *divisions* (6–10 *pairs*) *oblong*, very obtuse, finely serrate or cut-toothed, the lowest pinnatifid-lobed; *fruit dots as near the midvein as the margin;* indusium round-reniform, the sinus mostly shallow, smooth and naked. (*Nephrodium* Michx.; *Dryopteris* Gray.) — Swamps, etc.; common. July. — Stipes and the stout creeping rootstock bearing broad and deciduous chaffy scales. (Eu.)

Var. **Clintoniànum** D. C. Eaton. *Frond in every way much larger* (4–13 dm. long); *pinnae* oblong-lanceolate, *broadest at base* (8–15 cm. long, 2–5 cm. broad), deeply pinnatifid; the *divisions* (8–16 *pairs*) crowded or distant, *linear-oblong*, obtuse, obscurely serrate or cut-toothed, the basal sometimes pinnately lobed;

veins pinnately forking, the lowest anterior veinlets bearing the *fruit dots near the midvein;* indusium orbicular with a shallow sinus, smooth and naked. (*Dryopteris cristata*, var. Underw.) — Swampy woods, N. H. to N. C., and westw. to Wisc. July. — Rootstock stout, creeping, chaffy (like the stipes) with large bright-brown scales. Appears to hybridize with *A. marginale*, as does also the typical form of the species.

10. **A. spinulòsum** (O. F. Müller) Sw. Stipes with a few *pale-brown deciduous scales;* frond ovate-lanceolate, twice pinnate; *pinnae oblique to the rhachis, elongated-triangular*, the lower pairs broadly triangular; pinnules set obliquely on the midribs, connected by a very narrow wing, oblong, acute, incisely serrate or pinnatifid with spinulose-toothed lobes; *indusium* smooth and *without marginal glands.* (*Nephrodium* Strempel; *Dryopteris* Kuntze.) — Rich woods, Nfd. to Va., Ky., and northwestw. (Greenl., Eu.) A. PITTSFORDÈNSE (Slosson) Eastman, a supposed hybrid with *A. marginale*, occurs in Vt. and on Staten I., N. Y.

Var. **intermèdium** (Muhl.) D. C. Eaton. *Scales* of the stipe few, *brown with a darker center;* frond broadly oblong-ovate, tripinnatifid; *pinnae spreading, oblong-lanceolate*, the lower unequally triangular-ovate; pinnules crowded, ovate-oblong, spreading, pinnately cleft; the oblong lobes spinulose-toothed at the apex; *margin of the indusium denticulate and beset with minute stalked glands.* (*Nephrodium spinulosum*, var. Davenp.; *Dryopteris spinulosa*, var. Underw.) — Woods, common.

Var. **dilatàtum** (Hoffm.) Hook. *Scales* of the stipe large, *brown with a dark center; frond broader, ovate or triangular-ovate* in outline, tripinnatifid; pinnules lance-oblong, the lowest often much elongated; indusium glandular-ciliolate. (*Nephrodium spinulosum*, var. *fructuosum* Gilbert). — N. S. to Va., and N. Y. (Eu.) Forma ANADÈNIUM Robinson is in all respects like var. *dilatatum*, but with the indusium destitute of glands (the var. *dilatatum* of Am. auth. chiefly, not Hook.) — Common, chiefly in rocky upland woods. (Asia.)

Var. **concordiànum** (Davenp.) Eastman. *Fronds tripinnate; pinnules* (of the 3d order) *small* (4 mm. long), *elliptical*, spinulose-denticulate; indusium glandular-puberulent. — Concord, Mass. (*Purdie*).

15. CYSTÓPTERIS Bernh. BLADDER FERN

Fruit dots roundish, borne on the back of a straight fork of the free veins; the delicate indusium hood-like or arched, attached by a broad base on the inner side (toward the midrib) partly under the fruit dot, early opening free at the other side, which looks toward the apex of the lobe, and is somewhat jagged, soon thrown back or withering away. — Delicate ferns with 2–3-pinnate fronds; the lobes cut-toothed. (Name composed of κύστις, *a bladder*, and πτέρις, *fern*, from the inflated indusium.)

1. **C. bulbífera** (L.) Bernh. *Frond lanceolate, elongated, attenuate* (3–6 dm. long), 2-pinnate; the pinnae lanceolate-oblong, pointed, horizontal; the *rhachis and pinnae often bearing bulblets underneath, wingless;* pinnules crowded, oblong, obtuse, toothed or pinnatifid; indusium short, truncate on the free side. (*Filix* Underw.) — Shaded ravines, chiefly on calcareous rocks. July.

2. **C. frágilis** (L.) Bernh. *Frond oblong-lanceolate* (1–3 dm. long, besides the brittle stalk which is fully as long), 2–3-pinnate; the pinnae and *pinnules* ovate or lanceolate in outline, irregularly pinnatifid or cut-toothed, mostly acute, *decurrent on the margined or winged rhachis;* indusium tapering or acute at the free end. (*Filix* Underw.) — Shaded cliffs, rocky woods, etc.; common and varying greatly in the shape and cutting of the pinnules. July. (Cosmop.)

16. WOÓDSIA R. Br.

Fruit dots round, borne on the back of simply forked free veins; the very thin and often evanescent indusium attached by its base all around the receptacle, *under* the sporangia, either small and open, or else early bursting at the top into

irregular pieces or lobes. — Small and tufted pinnately divided ferns. (Dedicated to *Joseph Woods*, an English botanist.)

* *Stalks obscurely articulated some distance from the base; fronds chaffy or smooth, never glandular; indusium divided nearly to the center into slender hairs which are curled over the sporangia.*

1. **W. ilvénsis** (L.) R. Br. *Frond oblong-lanceolate* (5–15 cm. long, 2–4 cm. wide), smoothish and green above, *thickly clothed underneath as well as the stalk with rusty bristle-like chaff*, pinnate; the pinnae crowded, oblong, obtuse, sessile, pinnately parted, *the numerous crowded segments oblong*, obtuse, obscurely crenate; the fruit dots near the margin, somewhat confluent when old. — Exposed rocks; arctic Am., s. to N. E., the Great L. region, and in the mts. to N. C. June. (Eurasia.)

2. **W. alpina** (Bolton) S. F. Gray. *Frond narrowly oblong-lanceolate* (4–13 cm. long, 6–34 mm. wide), smooth above, *sparingly paleaceous-hirsute beneath*, pinnate; the pinnae triangular-ovate, obtuse, pinnately lobed, the lobes few and nearly entire; fruit dots rarely confluent. (*W. hyperborea* R. Br.) — N. B., Que., n. Vt., n. N. Y., Ont., and northw.; rare. (Eurasia.)

3. **W. glabélla** R. Br. *Smooth and naked throughout; frond linear* and very delicate (4–16 cm. high), pinnate; *pinnae roundish-ovate*, the lower ones rather remote (3–9 mm. long), obtuse, crenately lobed; fruit dots scanty; the hairs of the indusium fewer than in the last two species. — On moist mossy rocks, Nfd. to n. N. E., N. Y., Minn, and northw. to Alaska and Greenl (Eurasia.)

* * *Stalks not articulated; fronds never chaffy, often glandular-pubescent.*

← *Indusium of a few broad segments, at first covering the sorus completely.*

4. **W. obtûsa** (Spreng.) Torr. Frond broadly lanceolate, minutely glandular-hairy (2–5 dm. high), pinnate or nearly bipinnate; pinnae rather remote, triangular-ovate or oblong (2–6 cm. long), bluntish, pinnately parted; segments oblong, obtuse, crenately toothed, the lower pinnatifid with toothed lobes; veins forked, and bearing the fruit dots on or below the minutely toothed lobes; indusium at length splitting into several spreading jagged lobes. — Rocky banks and cliffs, "N. S.," and centr. Me. to Ga., and westw. Var. ANGÚSTA Peck is a form with very narrow fronds (35 cm. long and 4 cm. wide) and pinnae. — Highlands, N.Y.

← ← *Indusium entirely concealed beneath the sorus, divided into very narrow segments or reduced to minute hairs.*

5. **W. oregàna** D. C. Eaton. *Glabrous; fronds* bright green, soft in texture, *narrowly lance-oblong* (12–23 mm. wide), bipinnatifid, pinnae triangular-oblong, obtuse; the segments oblong or ovate, obtuse, crenate-serrulate, the teeth or margin nearly always reflexed. — Limestone cliffs and ledges, Bic, Que.; s. shore of L. Superior (*Robbins*), northw. and westw.

6. **W. Cathcartiàna** Robinson. *Finely glandular-puberulent; fronds* (2–3 dm. high) rather dull green, of firm texture, *lanceolate* (25–55 mm. broad), bipinnatifid; pinnae oblong, the lower distant; segments usually separated by wide sinuses, oblong, denticulate. (*W. scopulina* Man. ed. 6, not D. C. Eaton.) — Rocky river banks, w. Mich. (*Wheeler*), and n.e. Minn. (*Miss Ellen Cathcart.*)

7. **W. scopulìna** D. C. Eaton. *Loosely hispidulous with minute white hairs*, and finely glandular-puberulent; segments approximate, crenate-serrulate. — Limestone cliffs; Gaspé Co., Que.; S. Dak.; Rocky Mts., etc.; reported from Minn. and n.w. Ia.

17. DICKSÒNIA L'Hér.

Fruit dots small, globular, marginal, each placed on the apex of a free vein or fork; the sporangia borne on an elevated globular receptacle, inclosed in a membranaceous cup-shaped indusium which is open at the top, and on the outer side partly adherent to a reflexed toothlet of the frond. (Named for *James Dickson*, an English cryptogamic botanist.)

1. D. punctilóbula (Michx.) Gray. (HAY-SCENTED FERN.) Fronds minutely glandular and hairy (5–10 dm. high), ovate-lanceolate and acuminate in outline, pale green, very thin, with strong chaffless stalks rising from slender extensively creeping naked rootstocks, mostly bipinnate; primary pinnae lanceolate, pointed, the secondary pinnatifid into oblong and obtuse cut-toothed lobes; fruit dots minute, each on a recurved toothlet, usually one at the upper margin of each lobe. (*D. pilosiuscula* Willd.; *Dennstaedtia punctilobula* Moore.) — Common in moist and shady places, N.S. to Ala., rarer westw. to Minn. — Frond sweet-scented especially in drying. Forma CRISTÀTA (Maxon) Clute has the pinnae cristate-forked at tip. — Mass. and Vt. Forma SCHIZOPHÝLLA Clute has fronds often more deeply forked and the ultimate segments incised. — Mass. and Ct.

18. ONOCLÈA L.

Sporangia borne on elevated receptacles, forming roundish sori imperfectly covered by very delicate hood-shaped indusia attached to the base of the receptacles. Fertile fronds erect, rigid, with contracted pod-like or berry-like divisions at first completely concealing the sporangia, and at last, when dry and indurated, cracking open and allowing the spores to escape. Sterile fronds foliaceous. Rootstocks creeping and constantly forming new plants. (Name employed by Dioscorides for some probably boraginaceous plant.)

§ 1. EUONOCLÈA Hook. *Fertile fronds bipinnate.*

1. O. sensíbilis L. (SENSITIVE FERN.) Fronds scattered; the sterile ones long-stalked, the lamina 1–3 dm. long, deltoid-ovate, pinnatifid into a few oblong-lanceolate sinuately lobed or nearly entire segments; veins reticulated with fine meshes; fertile fronds contracted, closely bipinnate, the pinnules rolled up into berry-like bodies. — Moist meadows and thickets, very common. (E. Asia.) Sports are frequent, especially bipinnatifid foliaceous fronds with rounded lobes, free veins, and sometimes abortive sori, — the so-called var. OBTUSILOBÀTA (Schkuhr) Torr.

§ 2. STRUTHIÓPTERIS Mett. *Fertile fronds pinnate.*

2. O. Struthiópteris (L.) Hoffm. (OSTRICH FERN.) Fronds growing in a crown; sterile ones short-stalked (6–30 dm. high), broadly lanceolate, narrowed toward the base, with many linear-lanceolate pinnatifid pinnae; veins free, the veinlets simple; fertile frond shorter, with pod-like or somewhat necklace-shaped pinnae. (*Matteuccia* Todaro.) — Alluvial soil, Nfd. to Va., and northwestw. July. — The rootstock sends out slender underground stolons, which bear fronds the next year. (Eurasia.)

SCHIZAEÀCEAE (CURLY GRASS FAMILY)

Sterile fronds tufted and linear-filiform (Schizaea) or resembling a twining aerial stem with alternate paired palmately lobed leaves (Lygodium). Sporangia borne in double rows on narrow fertile segments, ovate, sessile, having a complete transverse ring at the apex, and opening by a longitudinal slit.

1. **Schizaea.** Sterile fronds rigid, simple or dichotomously branched. Plant dwarf, not climbing.
2. **Lygodium.** Fronds with paired alternate stipitate leaf-like segments.

1. SCHIZAÈA Sm. CURLY GRASS

Sporangia large, ovoid, striate-rayed at the apex, opening by a longitudinal cleft, naked, vertically sessile in a double row along the single vein of the narrow divisions of the pinnate (or radiate) fertile appendages to the slender and

simply linear, or (in foreign species) fan-shaped or dichotomously many-cleft fronds (whence the name, from σχίζω, *to split*).

1. **S. pusílla** Pursh. Sterile fronds linear, very slender, flattened and tortuous; the fertile ones equally slender (0.5 mm. wide), but taller (5–12 cm.) and bearing at the top the fertile appendage consisting of about 5 pairs of crowded pinnae (each 2–3 mm. long). — Low grounds, pine barrens of N. J.; N. S.; very local. Sept. (Nfd.)

2. LYGÒDIUM Sw. Climbing Fern

Fronds twining or climbing, bearing stalked and variously lobed (or compound) divisions in pairs, with mostly free veins; the fructification on separate contracted divisions or spike-like lobes, one side of which is covered with a double row of imbricated hooded scale-like indusia, fixed by a broad base to short oblique veinlets. Sporangia much as in *Schizaea*, but oblique, fixed to the veinlet by the inner side next the base, one or rarely two covered by each indusium. (Name from λυγώδης, *flexible.*)

1. **L. palmàtum** (Bernh.) Sw. Very smooth; stalk-like fronds slender, flexile and twining (3–10 dm. long), from slender running rootstocks; the short alternate branches or petioles 2-forked; each fork bearing a round-heart-shaped palmately 4–7-lobed frondlet; fertile frondlets above, contracted and several times forked, forming a terminal panicle. — Low moist thickets and open woods, s. N. H. to Fla., Tenn., and Ky.; local. Sept.

OSMUNDÀCEAE (Flowering Fern Family)

Leafy plants (ours herbaceous), *with creeping rhizomes. Sporangia naked, globose, mostly pediceled, reticulated, with no ring or with mere traces of one near the apex, opening into two valves by a longitudinal slit.* Stipes winged at the base.

1. OSMÚNDA [Tourn.] L. Flowering Fern

Fertile fronds or fertile portions of the frond destitute of chlorophyll, very much contracted, and bearing on the margins of the narrow rhachis-like divisions short-pediceled and naked sporangia; these globular, thin and reticulated, large, opening by a longitudinal cleft into two valves, and bearing near the apex a small patch of thickened oblong cells, the rudiment of a transverse ring. — Fronds tall and upright, growing in large crowns from thickened rootstocks, once or twice pinnate; veins forking and free. Spores green. (*Osmunder*, a Saxon name of the Celtic divinity, Thor.)

* *Sterile fronds truly bipinnate.*

1. **O. regàlis** L. (Flowering Fern.) Very smooth, pale green (0.3–1.6 m. high); sterile pinnules 13–25, varying from oblong-oval to lance-oblong, finely serrulate, especially toward the apex, otherwise entire, or crenately lobed toward the rounded, oblique and truncate, or even cordate and semi-auriculate base, sessile or short-stalked (2–5 cm. long); the fertile racemose-panicled at the summit of the frond. (*O. spectabilis* Willd.) — Swamps and wet woods, common. The cordate pinnules sometimes found here are commoner in Europe. May, June. (Eu.) Forma orbiculàta Clute has narrow fronds and few (3–7) roundish crowded pinnules on each pinna. — Hartland, Vt. (*Ruggles*).

** *Sterile fronds once pinnate; pinnae deeply pinnatifid; the lobes entire.*

2. **O. Claytoniàna** L. Clothed with loose wool when young, soon smooth; *fertile fronds taller than the sterile* (6–12 dm. high); pinnae oblong-lanceolate, with oblong obtuse divisions; *some* (2–5 *pairs*) *of the middle pinnae fertile*, these entirely pinnate; sporangia greenish, turning brown. — Low grounds, common. May. — Fruiting as it unfolds. (Himalayas.) Var. dùbia Grout is a peculiar

form with the pinnules of the sterile frond widely separated, the outer ones enlarged and pinnatifid, in s. Vt. (*Grout*).

3. **O. cinnamòmea** L. (CINNAMON FERN.) Clothed with rusty wool when young; *sterile fronds tallest* (at length 0.8–1.6 m. high), smooth when full grown, the lanceolate pinnae pinnatifid into broadly oblong obtuse divisions; *fertile fronds separate*, appearing earlier from the same rootstock and soon withering (2–9 dm. high), contracted, twice pinnate, covered with the cinnamon-colored sporangia. — Swamps and low copses, common. (Eurasia.) Var. FRONDÒSA Gray is an occasional state in which some of the fronds are sterile below and more sparsely fertile at their summit, or rarely in the middle. Var. INCÌSA J. W. Huntington is a form with the inner pinnules of some of the pinnae more or less cut or pinnatifid.

Var. **glandulòsa** Waters. Rhachis and lower surface of the sterile frond permanently glandular-pubescent. — R. I., N. J., and Md.

OPHIOGLOSSÀCEAE (ADDER'S TONGUE FAMILY)

Leafy and often somewhat fleshy plants; the leaves (fronds) simple or branched, often fern-like in appearance, erect in vernation, developed from underground buds formed either inside the base of the old stalk or by the side of it, and bearing in special spikes or panicles rather large subcoriaceous bivalvular sporangia formed from the main tissue of the fruiting branches. Prothallus underground, not green, monoecious. — A small family, separated from Ferns on account of the different nature of the sporangia, the erect vernation, etc.

1. **Ophioglossum.** Sporangia cohering in a simple spike. Veins reticulated.
2. **Botrychium.** Sporangia in pinnate or compound spikes, distinct. Veins free.

1. OPHIOGLÓSSUM [Tourn.] L. ADDER'S TONGUE

Rootstock erect, fleshy and sometimes tuberous, with slender fleshy roots which are sometimes proliferous; bud placed by the side of the base of the naked stalk; fronds with anterior and posterior segments as in *Botrychium*, but the coriaceous sporangia connate and coherent in two ranks on the edges of a simple spike. Sterile segment fleshy, simple in our species; the veins reticulated. Spores copious, sulphur-yellow. (Name from *ὄφις*, *a serpent*, and *γλῶσσα*, *tongue*.)

1. **O. vulgàtum** L. Fronds from a slender rootstock, 5–42 cm. high, mostly solitary; sterile segment sessile near the middle of the plant, ovate or elliptic-oblong (5–9 cm. long), *rounded or obtuse at the apex;* midvein indistinct or none; principal veins forming a loose network, the meshes nearly free from secondary veins. — Meadows and pastures, rarely on dry slopes; not common. June–Aug. (Eurasia.)

Var. **mìnus** Moore. Smaller; fronds often in pairs, the sterile segment slightly fleshy, yellowish-green, attached usually much below the middle of the plant. (*O. Grayi* Beck, acc. to Moore; *O. polyphyllum* A. Br.; *O. arenarium* E. G. Britton.) — Sandy ground, N. H. to w. N. Y. and N. J. (Eu., n. Afr.)

2. **O. Engelmánni** Prantl. Habit of the preceding species; *sterile segment* thicker, *cuspidate;* secondary veins numerous, forming a fine but readily discernible network within the meshes of the principal ones. — "Va."; Mo. (*Bush*), Tex., and Cal.

2. BOTRÝCHIUM Sw. MOONWORT

Rootstock very short, erect, with clustered fleshy roots; the base of the sheathed stalk containing the bud for the next year's frond; frond with an anterior fertile and a posterior sterile segment; the former mostly 1–3-pinnate, the contracted divisions bearing a double row of sessile naked sporangia; these

distinct, rather coriaceous, not reticulated, globular, without a ring, and opening transversely into two valves. Sterile segment of the frond ternately or pinnately divided or compound; veins all free. Spores copious, sulphur-color. (Name a diminutive of βότρυς, *a cluster of grapes*, from the appearance of the fructification.)

§ 1. EUBOTRÝCHIUM Milde. *Base of the stalk (containing the bud) completely closed; sterile segment more or less fleshy; the cells of the epidermis straight.*

* *Sterile segment sessile or on a short petiole (less than 1 cm. long).*

1. **B. Lunària** (L.) Sw. Very fleshy (8–18 cm. high); *sterile segment subsessile*, borne near the middle of the plant, *oblong, simply pinnate with* 5–15 *lunate or fan-shaped* very obtuse crenate, incised, or nearly entire, *fleshy divisions*, more or less excised at the base on the lower or on both sides, the *veins* radiating from the base and *repeatedly forking;* fertile segment panicled, 2–3-pinnate. — Open places, c. Que. to Vt., n. O., L. Superior, and northw.; rare. (Widely distr.) Fig. 1. Also on wooded cliffs near Syracuse, N. Y., where tending to a more slender form with decidedly stipitate sterile segment and subremote more narrowly cuneate pinnae (*B. onondagense* Underw.).

1. B. Lunaria. × ⅔.

2. **B. símplex** E. Hitchcock. Fronds small (5–10 or rarely 25 cm. high); *sterile segment short-petioled* from near base, middle, or summit of the stalk, thickish, simple, and roundish, or pinnately 3–7-lobed; the lobes roundish-obovate, nearly entire, decurrent on the broad and flat indeterminate rhachis, the terminal one usually emarginate; *the veins all forking from the base;* fertile segment simple or 1–2-pinnate. (*B. tenebrosum* A. A. Eaton.) — N. S. to Md., Ont., Minn., and Rocky Mts.; rare. (Eu.) Fig. 2. Var. compósitum Lasch. Sterile segment binate or ternate; the divisions pinnatifid. — Occurring with and clearly passing into the typical form.

2. B. simplex. × ⅔.

3. **B. lanceolàtum** (Gmel.) Ångstroem, var. **angustisegméntum** Pease & Moore. Fronds small (1–2.5 dm. high); *the sterile segment closely sessile at the top of the* long and slender *stalk*, scarcely fleshy, *triangular, ternately twice pinnatifid; the acute lobes* lanceolate, incised or toothed; veinlets forking from a *continuous midvein;* fertile part 2–3-pinnate. — N. S. to N. J., O., and L. Superior. July, Aug. Fig. 3. The typical European form has the segments of the sterile frond broader and more approximate.

3. B. lanc., v. ang. × ⅔.

4. **B. ramòsum** (Roth) Aschers. Fronds small (1–2.5 dm. high); *the sterile segment nearly sessile at the top of the* long and slender *common stalk*, moderately fleshy, *ovate or triangular*, varying from pinnate to bipinnatifid; *the lobes oblong-ovate and obtuse; midvein dissipated* into forking veinlets; fertile part 2–3-pinnate. (*B. matricariaefolium* A. Br.; *B. neglectum* Wood.) — Rich soil, e. Que. to Md., and westw. June, July. (Eurasia.) Fig. 4.

4. B. ramosum. × ⅔.

** *The sterile segment on a long petiole (2–16 cm. in length).*

5. **B. oblìquum** Muhl. Subcoriaceous (1–4 dm. high), sparsely hairy or glabrous; sterile segment long-petioled, springing from near the base of the plant, broadly triangular or somewhat pen-

tagonal, ternate and variously decompound with stalked divisions, *these ovate-oblong, acutish*, usually two or three times as long as broad, crenate-serrulate, obliquely cordate or subcordate; fertile segment erect, 2–4-pinnate. (*B. ternatum*, var. *obliquum* Milde.) — Pastures and open woods, N. B. to Ont., Minn., and southw. FIG. 5, *a*. Polymorphous. The chief forms are: Var. ONEIDÉNSE (Gilbert) Waters. FIG. 5, *b*. Ultimate divisions broadly oblong, rounded at the apex, crenulate-serrulate. — Vt. (*Miss Gilman*) to centr. N. Y. (*Gilbert, Haberer*), etc. Var. TENUIFÒLIUM (Underw.) Gilbert. Divisions few, usually 9, thin; otherwise much like the typical form. — N. Y. (acc. to *Gilbert*); Mo. (*Bush*), and southw. to the Gulf. Var. ELONGÀTUM Gilbert & Haberer. FIG. 5, *c*. Divisions lanceolate, elongated, acute. — Mass. to centr. N. Y. and D. C. Var. DISSÉCTUM (Spreng.) Clute. FIG. 5, *d*. Divisions incisely many-toothed. — Often with the typical form in N. E., N. Y., and O.

5. B. obliquum and vars. × ⅔.

6. **B. ternàtum** (Thunb.) Sw., var. **intermèdium** D. C. Eaton. Stout, decidedly fleshy, loosely pubescent to subglabrous, 1.5–4 dm. high; habit and fertile segment as in the preceding; sterile segment becoming large (sometimes 2 dm. broad), its *ultimate divisions numerous, ovate or obovate*, commonly subcuneate or semicordate at the base, crenulate and more or less lobed, usually obtuse or rounded at the apex. (Including var. *australe* D. C. Eaton, as to Am. plant.) — Sandy soil, pastures and open woods, common, N. E., N. Y., and (?) n. Mich. FIG. 6. Passing insensibly into var. RUTAEFÒLIUM (A. Br.) D. C. Eaton. More slender, rarely over 1.7 dm. high; sterile segment commonly about 5 cm. broad, its divisions few, broadly ovate, the lowest sublunate. (*B. Matricariae* Spreng.; *B. rutaceum* Sw.) — Nfd. to s. N. H., and n. Mich. (Eurasia.)

6. B. tern., v. interm. × ⅔.

§ 2. OSMUNDÓPTERIS Milde. *Base of the stalk (containing the bud) open along one side; sterile segment membranaceous; the cells of the epidermis flexuous.*

7. **B. virginiànum** (L.) Sw. (RATTLESNAKE FERN.) *Fronds 3–6 dm. tall, ample; sterile segment sessile above the middle of the plant*, broadly triangular, thin and membranaceous, *ternate;* the short-stalked *primary divisions once or twice pinnate*, and then once or twice pinnatifid; the oblong lobes cut-toothed toward the apex; *veins forking from a midvein;* fertile part 2–3-pinnate. — Rich woods, common. June, July (Widely distr.)

MARSILEÀCEAE

Perennial plants rooted in mud, having a slender creeping rhizome and either filiform or 4-parted long-petioled leaves; the somewhat crustaceous several-celled sporocarps borne on peduncles which rise from the rhizome near the leaf-stalks, or are more or less consolidated with the latter, and contain both macrospores and microspores.

1. MARSÍLEA L.

Submersed or emersed aquatic plants. Leaves 4-foliolate. Sporocarps with 2 teeth near the base, 2-celled vertically, with many transverse partitions, splitting into 2 valves at maturity, and emitting an elastic cord or band of tissue, which

carries the sporangia on a series of short branches or lobes. (Named for *Aloysius Marsili*, an early Italian naturalist.)

1. **M. quadrifòlia** L. Leaflets broadly obovate-cuneate, glabrous; *sporocarps usually 2 or 3 on a short peduncle from near the base of the petioles*, pediceled, glabrous or somewhat hairy, the basal teeth small, obtuse, or the upper one acute. — In water, the leaflets commonly floating on the surface; frequently cultivated and now somewhat extensively introduced from material taken chiefly from Bantam Lake, Litchfield, Ct., where perhaps casually introduced from Eu.

2. **M. vestìta** Hook. & Grev. Leaflets broadly cuneate, usually hairy, entire (5–15 mm. long and broad); petioles 2–11 cm. long; *peduncles free from the petiole*, very short; *sporocarps solitary*, hairy when young (about 4 mm. long), with upper basal tooth longest, acute, straight or curved, lower tooth acute, the sinus between them rounded. — In swamps which become dry in summer; Ia. and southwestw.

SALVINIÀCEAE

Floating plants of small size, having a more or less elongated and sometimes branching axis, bearing apparently distichous leaves; sporocarps (sori) very soft and thin-walled, two or more on a common stalk, one-celled and having a central, often branched receptacle which bears either macrosporangia containing solitary macrospores, or microsporangia with numerous microspores. — A small and interesting family of plants without close affinity to other groups.

1. AZÓLLA Lam.

Small moss-like plants, the stems pinnately branched, covered with minute 2-lobed imbricated leaves, and emitting rootlets on the under side. Sporocarps in pairs beneath the stem; the smaller ones acorn-shaped, containing at the base a single macrospore with a few attached bodies of doubtful function above it; the larger ones globose, and having a basal placenta which bears many pedicellate microsporangia which contain masses of microspores. (Name not satisfactorily explained.)

1. **A. caroliniàna** Willd. Plants somewhat deltoid in outline (6–25 mm. broad), much branched; leaves with ovate lobes, the lower lobe reddish, the upper one green with a reddish border; macrospore with three attendant corpuscles, its surface minutely granulate; masses of microspores glochidiate. — Floating on quiet waters, from L. Ontario westw. and southw. — Appearing like a reddish hepatic moss.

2. SALVÍNIA [Mich.] Adans.

Leaves apparently 2-ranked, horizontally floating or subaërial, a third series of foliar structures developed ventrally on the stem taking the form of fascicles of root-like fibers. Sporangia subsessile, clustered, depressed-globose, longitudinally sulcate, formed from the tips of short basal divisions of the filiform ventral leaves. Sori basal within the fruit, the macrosporangia subsessile, the microsporangia (in separate fruits) borne on filiform pedicels. (Named for *Prof. Antonio Maria Salvini* of Florence, 1633–1729.)

1. **S. nâtans** (L.) All. Foliage-leaves suborbicular-oblong, thickish, mostly 10–15 mm. long, hairy or papillose on both sides, the lower surface commonly brownish or purplish. — Marshes and ponds, Minn. and Mo. — Long ago reported by *Pursh* as "floating, like *Lemna*, on the surface of stagnant waters: in several of the small lakes in the western parts of New York," but not detected in this region by recent botanists. (Eurasia.)

EQUISETÀCEAE (Horsetail Family)

(Revised by A. A. Eaton.)

Rush-like, often branching plants, with jointed and mostly hollow stems from running rootstocks, having sheaths at the joints, and, when fertile, terminated by the conical or spike-like fructification composed of shield-shaped stalked scales bearing the spore-cases beneath. — A single genus.

1. EQUISÈTUM [Tourn.] L. Horsetail

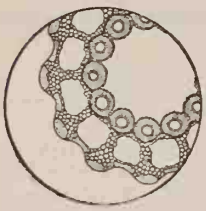
Rootstocks perennial, jointed, branched, wide-creeping, dull and blackish, felted or naked, often tuber-bearing, the nodes provided with toothed, often felted sheaths; roots in verticils from the nodes, annual, felted. Stems usually erect, simple or branched, cylindrical, jointed, the surface regularly striated, overlaid with teeth, dots, bands, rosettes, or a smooth coat of silex; the stomata in the grooves in regular rows or broad bands; the internodes (except in *E. scirpoides*) bearing a large central air-cavity (centrum), a medium sized one (vallecular) under each groove, with which the stomata connect, and a smaller one (carinal) under each ridge. The nodes are closed and solid, each bearing a whorl of reduced leaves joined by their edges into cylindrical sheaths, their tips thinner and prolonged into persistent or deciduous teeth. Branches, when present, mostly in whorls from the nodes. Fruit in a terminal cone formed of regular verticils of stalked sporophylls, the 6 or 7 sporangia opening down the inner side and discharging many loose green spores, each provided with four elastic hygroscopic clavate bands. Prothallus in damp places, dioecious, green, variously lobed. (The ancient name from *equus*, horse, and *seta*, bristle.)

§ 1. Stems annual; spikes rounded; stomata scattered in the grooves. — Euequisètum Sadebeck *a*.
- *a*. Fruiting stem succulent, appearing before the sterile.
  - Fertile stems branchless, soon perishing; silex of sterile stems in dots . . . . . 1. *E. arvense*.
  - Fertile stems becoming branched.
    - Branches simple; silex in 3 rows of broad spinules on the ridges . 2. *E. pratense*.
    - Branches compound; silex in 2 rows of hooked spinules . . 3. *E. sylvaticum*.
- *a*. Fertile and sterile stems alike, branched or simple.
  - Centrum one sixth of the total diameter of stem; teeth grooved, black, with broad white margins . . . . . 4. *E. palustre*.
  - Centrum half the total diameter or more.
    - Centrum not more than two thirds the diameter; vallecular holes present; sheaths loose; fruit abortive . . . . . 5. *E. litorale*.
    - Centrum four fifths the diameter; vallecular holes mostly absent; sheaths tight . . . . . 6. *E. fluviatile*.

§ 2. Stems evergreen (except in *E. laevigatum* and *E. variegatum*, v. *Nelsoni*), mostly simple; spikes apiculate; stomata in single regular series. — Hippochaète Milde *b*.
- *b*. Silex in cross-bands on ridges and grooves *c*.
  - *c*. Vallecular bast cutting the green parenchyma, carinal not doing so; sheaths ampliated, green.
    - Teeth deciduous, leaving black triangular bases; centrum wide . 7. *E. laevigatum*.
    - Teeth persistent, broadly white-bordered; centrum small . . . . . (9) *E. variegatum*, v. *Nelsoni*.
  - *c*. Vallecular bast not cutting the parenchyma, the carinal larger; sheaths usually with black and white bands.
    - Sheaths much longer than broad, ampliated; plants similar to *E. laevigatum* in appearance . . (8) *E. hyemale*, v. *intermedium*.
    - Sheaths little longer than broad, tight . . . . (8) *E. hyemale*, v. *robustum*.
- *b*. Ridges biangulate (except in *E. variegatum*, v. *Nelsoni*); silex of the grooves in rosulae *d*.
  - *d*. Teeth deciduous; ridges slightly biangulate . . . . . 8. *E. hyemale*.
  - *d*. Teeth persistent, white-bordered *e*.
    - *e*. Centrum one third of the diameter of the stem.
      - Ridges distinctly biangulate; bristle-tips of teeth deciduous . 9. *E. variegatum*.
      - Ridges slightly biangulate; tips of teeth persistent (9) *E. variegatum*, v. *Jesupi*.
      - Ridges rounded . . . . . (9) *E. variegatum*, v. *Nelsoni*.
    - *e*. Centrum absent; stems 6-angled . . . . . 10. *E. scirpoides*.

§ 1. EUEQUISÈTUM Sadebeck. *Stems annual, mostly with regular verticils of branches; spikes not apiculate; stomata in one or two broad bands in each groove, their surfaces overlaid with a silex plate that bears a vertical slit in the center.*

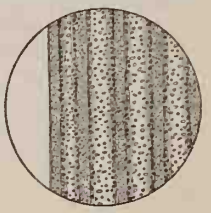
1. **E. arvénse** L. (COMMON H.) Fertile stems 0.5–2.5 dm. high, with loose 8–12-toothed sheaths, not rarely developing a few branches in wet places; sterile stems prostrate or erect, 0.5–5 dm. high, 10–14-furrowed, variously branched; silex in punctiform dots; branches 3–4-angled, mostly simple, solid, winged, the teeth of their sheaths triangular-lanceolate, with sharp erect acuminate points; rootstocks tuberiferous, felted; centrum $\frac{1}{2}$–$\frac{2}{3}$ the total diameter of the stem. — Common. (Widely distr.) FIG. 7.



7. E. arvense. Cross-section of stem × 12.

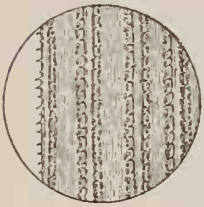
2. **E. praténse** Ehrh. Sterile and finally fertile stems developing simple horizontal triangular branches whose first internodes do not exceed the stem-sheaths; teeth of branch-sheaths deltoid, acute; stems 2–3 dm. high, 8–20-ridged, beset with flat spines of silex, arranged in threes; centrum $\frac{1}{3}$ the total diameter. — Alluvial soil, N. S. and Que. to Alaska, southw. to w. Mass., N. J., and Ia., chiefly in calcareous regions. April, May. (Eurasia.) FIGS. 8, 9.

8. E. pratense. Cross-section of stem × 12.

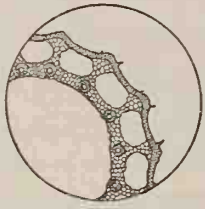


9. E. pratense. Epidermis × 12.

3. **E. sylváticum** L. Stems 0.7–4.5 dm. high; both kinds developing compound branches; centrum half the diameter; ridges 8–14, flat, with a row of recurved spinules on each side; sheaths green, with the papery brown teeth coherent; primary branches 4–5-angled, the secondary 3-angled. — Damp, shady places, Nfd. to Alaska, southw. to Va., O., and Ia.; common northw. May, June. (Eurasia.) FIGS. 10, 11.



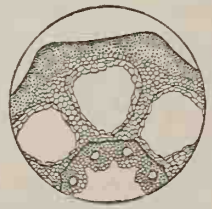
10. E. sylvaticum. Epidermis × 12.



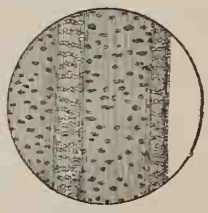
11. E. sylvaticum. Cross-section of stem × 12.

4. **E. palústre** L. Rootstocks shining, black, solid at center; stems 2.5–9 dm. high, deeply 5–10-grooved; ridges narrow, sharply elevated; sheaths widened upward; leaves centrally grooved; teeth lance-subulate, black, with broad white margins; silex in cross-bands; centrum $\frac{1}{6}$ the total diameter; branches hollow, 4–7-angled. — Wet places, Nfd. to Alaska, southw. to Ct. (*Graves*), Ill. (*Brendel*), etc. June–Aug. (Eurasia.) FIGS. 12, 13.

5. **E. litorále** Kühlewein. Stems diffuse to erect, simple to densely branched, 2–9 dm. high, 6–18-grooved; centrum $\frac{1}{2}$–$\frac{2}{3}$ the total diameter; vallecular holes present; sheaths slightly spreading; teeth dark brown, acute, coherent in groups; branches 2.5–15 cm. long, 3–5-angled, winged, often solid, similar to those of *E. arvense*; spikes usually abortive. — Wet,

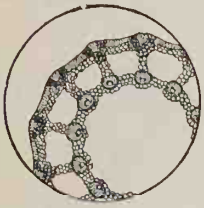


12. E. palustre. Cross-section of stem × 12.



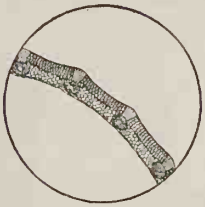
13. E. palustre. Epidermis × 12.

sandy shores, N. B. to Pa., Minn., and westw. May, June. (Eu.) — Possibly a hybrid. Figs. 14, 15.



14. E. litorale. Cross-section of stem × 12.

15. E. litorale. Cross-section of stem near apex × 12.



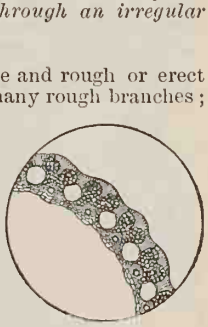
16. E. fluviatile. Cross-section of stem × 12.

17. E. fluviatile. Cross-section of stem near apex × 12.

6. **E. fluviátile** L. (Pipes.) Stems erect, 3–15 dm. high, with 10–30 shallow grooves, simple, or branched in the middle; centrum $\frac{4}{5}$ the total diameter; vallecular holes absent except at bases of largest stems; branches 2.5–16 cm. long, 4–6-angled, hollow, not winged, horizontal, with erect tips; sheaths appressed; teeth dark brown, narrow, acute, rigid, distinct. (*E. limosum* L.) — Shallow water and mud-banks, common. June, July. (Eu.) Figs. 16, 17.

§ 2. HIPPOCHAÈTE Milde. *Stems mostly evergreen, simple or becoming sparingly branched, mostly rough; spikes apiculate; stomata (in ours) in a single regular row on each side of the groove, overlaid by the siliceous coat of the stem, having access to the air through an irregular hole.*

7. **E. laevigàtum** A. Br. Stems mostly annual, diffuse and rough or erect and nearly smooth, 1–12 dm. long, simple or with few to many rough branches; centrum $\frac{3}{4}$ the diameter of stem; sheaths widened upward, green with narrow black limb; teeth of the stem-sheaths mostly deciduous, leaving black triangular bases, those of the branches persistent; leaves flat above, ridged below; green parenchyma continuous under the keels, separated by the vallecular bast. — Alluvial soils, O. to B. C. and Tex. June–Aug. Fig. 18.



18. E. laevigatum. Cross-section of stem × 12.

8. **E. hyemàle** L. (Scouring Rush.) Stems erect, mostly simple, 3 to 9 dm. high, the ridges slightly grooved on the back with a row of tubercles on each side; sheaths longer than broad, tight, with two black rings separated by an ashy one; teeth mostly deciduous; centrum usually $\frac{2}{3}$ the total diameter; green parenchyma continuous over the vallecular holes, separated by the bast under the ridges. — Eu.

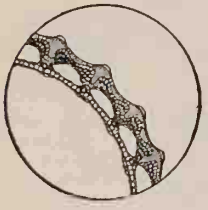
Var. **intermèdium** A. A. Eaton. Stems evergreen, simple, erect, 3–12 dm. high, smoothish or rough with cross-bands of silex; sheaths widened upward, the lower with basal and terminal black rings separated by an ashy band, all similarly marked the second year; green parenchyma continuous over the vallecular holes, separated by the carinal bast. — Moist sandy soils, Ct., N. Y., and Mich. to Tex. and Cal. May–Aug. — Often confused with *E. laevigatum*. Fig. 19.

Var. **affine** (Engelm.) A. A. Eaton. Differs from the type only in having the ridges rounded instead of biangulate. — Can. to Mex.; common in N. E., less common than the next further west.

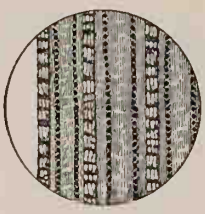
Var. **robùstum** (A. Br.) A. A. Eaton. Mostly stout, 12–30 dm. high, 6–18 mm. thick; ridges rounded; sheaths nearly as broad as long; leaves with a central and two lateral ridges; teeth mostly persistent. (*E. robustum* A. Br.) —

Md. to Mich., southwestw. and westw.; rare east of the Miss. R. (Mex., Asia.) FIGS. 20, 21.

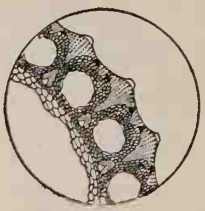
9. **E. variegàtum** Schleich. Stems tufted, ascending, 1.5 to 3 dm. high, slender, 5–10-grooved; ridges with broad central grooves; centrum $\frac{1}{3}$ the



19. E. hyemale, v. intermedium. Cross-section of stem × 12.



20. E. hyemale, v. robustum. Epidermis × 12.



21. E. hyemale, v. robustum. Cross-section of stem × 12.

total diameter; green parenchyma continuous under the keels, interrupted in the grooves; sheaths loose, green below, black-girdled above; leaves 4-carinate; teeth black, with broad hyaline white borders, persistent, with long filiform deciduous tips. — Lab. to Alaska, southw. to Me., N. Y., and Wyo.; rare. (Eurasia.)

Var. **Jesùpi** A. A. Eaton. Stems ascending or erect, 2–4 dm. high, 10–12-furrowed; ridges with slight central grooves; centrum $\frac{1}{2}$–$\frac{2}{3}$ the total diameter; carinal bast cutting the parenchyma, the vallecular small; sheaths green, with black limbs, becoming ashy with black bases; teeth brown-centered, white-bordered, with flexuous persistent awn-points, often becoming papery and withering. — Que. and Ont., southw. to Ct. and Ill.

Var. **Nelsòni** A. A. Eaton. Stems annual, tufted, slender, 1.5–4 dm. high; angles rounded; sheaths ampliated, green, with narrow black limb, becoming dusky; teeth centrally grooved, with dark centers and broad white borders, bearing deciduous awn-points; centrum $\frac{1}{3}$ the total diameter of stem; bast similar to the type. — N. Y. to Mich. and Ill.

22. E. scirpoides. Cross-section of stem × 12.

10. **E. scirpoìdes** Michx. Stems many in a tuft, filiform, 0.75 to 1.5 dm. high, flexuous and curving, solid at the center, 6-ridged through the deep grooving of the 3 angles; sheaths with 3 persistent hyaline-bordered filiform-tipped teeth. — Moist evergreen woods and low fields; Lab. to Pa., Ill., and northwestw. (Eurasia.) FIG. 22.

LYCOPODIÀCEAE (CLUB MOSS FAMILY)

Low plants, usually of moss-like aspect, with elongated and often much branched stems covered with small lanceolate or subulate, rarely oblong or rounded, persistent entire leaves; the sporangia 1–3-celled, solitary in the axils of the leaves, or on their upper surface, when ripe opening into two or three valves, and shedding the numerous yellow spores, which are all of one kind. — The Family, as here defined, consists mainly of the large genus

1. LYCOPÒDIUM L. CLUB MOSS

Spore-cases coriaceous, flattened, usually kidney-shaped, 1-celled, 2-valved, mostly by a transverse line round the margin, discharging the subtile spores, in the form of a copious sulphur-colored inflammable powder. — Perennials, with evergreen one-nerved leaves imbricated or crowded in 4–16 ranks. (Name compounded of λύκος, *a wolf*, and πούς, *foot*, from a fancied resemblance.)

a. Spore cases in the axils of ordinary dark-green shining leaves, not forming a well marked terminal spike; gemmae commonly present.
Leaves uniform . . . . . 1. *L. Selago.*
Leaves in zones, alternately shorter and longer . . . . . 2. *L. lucidulum.*
a. Spore cases only in the axils of the upper (bracteal) leaves, forming a spike *b.*
b. Bracteal leaves scarcely or not at all modified in form or texture.
Bracteal leaves lance-linear or linear, scarcely broader at the base . 3. *L. alopecuroides.*
Bracteal leaves linear-attenuate from a distinctly broadened ovate base . . . . . 4. *L. inundatum.*
b. Bracteal leaves scale-like, yellowish, very different from those of the sterile parts of the stem *c.*
c. Sterile branches convex and uniformly leafy on all sides.
Free part of leaves 4–8 mm. long; fertile branches mostly 1.5–2.5 dm. high.
Fertile branches leafy up to the spikes.
Creeping stem deep in the ground, the upright branches repeatedly forked, tree-like . . . (7) *L. obscurum*, v. *dendroideum.*
Creeping stem on or near the surface of the ground, its numerous erect branches mostly subsimple or sparingly forked . . . . . 5. *L. annotinum.*
Fertile branches modified beneath the spikes into scaly peduncles . . . . . 6. *L. clavatum.*
Free parts of the leaves 1–3 mm. long; fertile branches usually 5–13 cm. high . . . . . 8. *L. sitchense.*
c. Sterile branches flattened or concave beneath, the leaves usually reduced or modified on the lower surface *d.*
d. Fertile branches leafy essentially to the spikes . . . . . 7. *L. obscurum.*
d. Spikes borne on scaly peduncles *e.*
e. Peduncles terminating upright leafy branches.
Fertile branches usually 5–10, rarely 15 cm. high; free part of lateral leaves linear-subulate, spreading, nearly or quite as long as the adnate part . . . . . 9. *L. sabinaefolium*
Fertile branches usually 1.5–3 dm. high; free part of lateral leaves deltoid-subulate, scarcely more than one third to one half the length of the adnate part.
Running stems deep in the ground; branches narrowly linear, 1.3–1.8 mm. broad, their divisions very numerous and crowded . . . . . 12. *L. tristachyum.*
Running stems at or near the surface of the ground; branches 2–4 mm. broad, more loosely and openly forked . . . . . 11. *L. complanatum.*
e. Peduncles springing directly from a short horizontal rootstock 10. *L. carolinianum.*

1. **L. Selàgo** L. Stems erect and rigid, dichotomous, from a *short slender rootstock*, forming a level-topped tuft (0.5–2.5 dm. high); *leaves uniform, lance-attenuate*, crowded, *ascending*, glossy, pale green or yellowish, sharp-pointed, entire or denticulate; sporangia in the axils of unaltered leaves. — Crevices of exposed or cold rock, chiefly alpine; Greenl. to Alaska, s. to N. E., L. Superior, Mont., and Wash., and on the higher Alleghenies to Va. (Widely distr.) — Commonly gemmiparous in the upper axils. Var. APPRÉSSUM Desv. *Leaves* closely crowded, *appressed.* — Usually more abundant, extending s. to N. C.

Var. **pàtens** (Beauv.) Desv. *Leaves linear-attenuate and wide-spreading*, dark green. — Cool calcareous cliffs, Que. and n. Vt.

2. **L. lucídulum** Michx. Stems assurgent, the *old elongate bases very persistent; leaves* pointed, *toothed*, at first spreading, then deflexed, *distinctly broader above the middle*, arranged *in alternate zones of shorter and longer leaves*, the shorter leaves more frequently bearing sporangia in their axils; proliferous gemmae usually abundant but caducous. — Cold, damp woods; Nfd. to Ont., Minn., Ia., Ind., and southw. in the Alleghenies to S. C.

Var. **poróphilum** (Lloyd & Underw.) Clute. *Leaves lance-linear, attenuate*, narrowed from base to apex, nearly or quite *entire.* (*L. porophilum* Lloyd & Underw.) — Mts. and cold ravines, local; Nfd. and e. Que. to Wisc., s. to S. C. and Ala.

3. **L. alopecuroìdes** L. *Stems stout*, very densely leafy throughout; the sterile branches recurved-procumbent and creeping; the fertile of the same thickness, 13–33 cm. high; *leaves narrowly linear-awl-shaped, spinulose-pointed, spreading, conspicuously bristle-toothed below the middle; those of the cylindrical spike with long setaceous tips.* (*L. adpressum* Lloyd & Underw., in

part.) — Pine-barrens and sandy swamps, Nantucket (*Mrs. Owen*, *Dame*, *Floyd*), L. I., and southw. Aug., Sept. — Stems, including the dense leaves, 15 mm. in thickness; the comose spike, with its longer spreading leaves, 18–22 mm. thick. (S. A.)

4. **L. inundàtum** L. *Dwarf;* creeping sterile stems forking, flaccid, 3–10 (rarely 15) cm. high, bearing a short thick spike; sporophylls usually toothed near the ovate base, their attenuate tips herbaceous, loosely spreading; *leaves lanceolate or lance-awl-shaped*, *acute*, soft, spreading, *mostly entire*, those of the prostrate stems curving upward. — Sandy shores and in sphagnum, Nfd. to N. J., and northwestw. to Alaska. (Eurasia.) Var. BIGELÒVII Tuckerm. *Taller* (the fertile branches 1–3 dm. high); *sporophylls more incurved or appressed*, commonly somewhat stramineous, *mostly entire*. (*L. adpressum* Lloyd & Underw. in part.) — Sandy shores, e. Mass. to Md.

5. **L. annótinum** L. Much branched; *stems prostrate and creeping* (3–12 dm. long); *the ascending branches similar* (1–2.5 dm. high), sparingly forked sterile ones making yearly growths from the summit; *leaves equal*, *spreading*, in about 5 ranks, rigid, lanceolate, pointed, minutely serrulate (pale green); spike solitary, thickish-cylindrical. — Open woods, Nfd. to Ct., Minn., Col., Alaska, and Greenl. (Eurasia.) In exposed and alpine situations replaced by var. PÚNGENS Desv., a form with short thick more rigid leaves which are 3–4 mm. long and erectish. — Nfd. to n. N. Y., and northwestw. (Eurasia.)

6. **L. clavàtum** L. (COMMON C.) Stems creeping extensively, with similar ascending short and very leafy branches; the fertile terminated by a slender peduncle (1–1.5 dm. long), bearing about 2–4 slender cylindrical spikes; *leaves* linear-awl-shaped, incurved-spreading (light green), *tipped*, as also the bracts, *with a fine bristle*. — Dry woods; common especially northw. July. (Cosmop.) Var. MONOSTÀCHYON Grev. & Hook. Spike solitary on each peduncle commonly of larger size (sometimes 8 cm. long). — E. Que. to Ct. and northwestw. Var. BREVISPICÀTUM Peck. Spikes solitary or in pairs, very short (1.3–2.4 cm. long), thickish, blunt; peduncles 3–5 cm. long. — Wallface Mt., N. Y. (*Peck*). A sterile form with greatly elongated peduncles is sometimes found: Taconic Mts., w. Mass. (*Harrison*), and Green Mts., Vt. (*Kent*).

7. **L. obscùrum** L. Rootstock cord-like, subterranean, bearing scattered erect tree-like stems dividing at the summit into several densely dichotomous spreading branches; leaves linear-lanceolate, decurrent, entire, acute, 6-ranked, those of the two upper and two lower ranks smaller and appressed, the lateral ones incurved-spreading; spikes 1–3, erect, essentially sessile; bracts scarious-margined, broadly ovate, abruptly apiculate. — Rich woods, N. E. to Va. — Passing imperceptibly into

Var. **dendroídeum** (Michx.) D. C. Eaton. Leaves equal, erect or incurved; branches scarcely or not at all dorsiventral, usually erect and crowded; spikes 1–15. (*L. dendroideum* Michx.) — The more common form, in woods or on open hillsides, Nfd. to N. C. and L. Superior.

8. **L. sitchénse** Rupr. Glaucous; rootstock long, nearly superficial; stems short, numerous, erect, divided from near the base into numerous erect subsimple crowded branches (3–7 cm. high), equally leafy all round; leaves equal, few-ranked, ascending, about 2 mm. long, slender, very acute; spikes on short but usually distinct scaly peduncles; sporophylls green with scarious erose margin, the tip spreading. — Coniferous woods, e. Que. and n. Me.; Mt. Katahdin; Mt. Washington, N. H. (*Eggleston*); Adirondack Mts., N. Y. (*Peck*); n. shore of L. Superior; Alaska.

9. **L. sabinaefòlium** Willd. In habit similar to the preceding; branches 5–10 cm. long, flexuous, dorsiventral; the leaves on the lower surface smaller; peduncles 2–3 cm. long. — Dry woods, e. Que. to Vt.; Staten Isl., N. Y. (*Buchheister*); and L. Superior (*G. S. Miller*).

10. **L. caroliniànum** L. Sterile stems and their few short branches *entirely creeping* (leafless and rooting on the under side), thickly clothed with broadly lanceolate acute and somewhat oblique 1-nerved *lateral leaves widely spreading in 2 ranks*, and a shorter intermediate row appressed on the upper side; also sending up a slender simple peduncle (7–21 cm. long, clothed merely with

small bract-like and appressed awl-shaped leaves) *bearing a single cylindrical spike.* — Wet pine-barrens, N. J. to Va., and southw.

11. **L. complanàtum** L. *Rootstock nearly superficial;* stems erect, irregularly branched or forked, the branches very flat, more or less glaucous, few-forked, the divisions (0.5–1.5 dm. long, 2-4 mm. wide) erect or but slightly spreading, all clothed with minute imbricated-appressed awl-shaped leaves in 4 ranks with decurrent adnate bases, the lateral with tooth-like tips; peduncles (about 3 cm. long) bearing 1–3 erect spikes. — Dry coniferous woods, Nfd. to Me., Ida., and Alaska. (Eurasia.)

Var. **flabellifórme** Fernald. (Ground Pine.) Brighter green; the branches sevèral-forked and spreading in a fan-like manner, the terminal divisions 0.5–4 cm. long and 1.5–3 mm. broad; peduncles (averaging 7 cm. long) mostly 4-spiked. — Dry woods, N. S. to W. Va., Ky., Ia., and Minn.; common. Var. Wíbbei Haberer is a form with peduncles only 1-spiked. — N. Vt. and centr. N. Y.

12. **L. tristàchyum** Pursh. Very glaucous; *rootstock deep* (5–12 cm. below the surface); stems erect, the branches numerous, crowded, erect, 1–2 mm. broad; peduncles (8–12 cm. long) with a few scattered attenuate bracts and bearing 1–5 (mostly 4) spikes. (*L. Chamaecyparissus* A. Br.; *L. complanatum*, var. *Chamaecyparissus* Milde.) — Dry sandy soil, n. Me. to Del., and L. Superior; southw. in the mts. to N. C. (Eu.)

SELAGINELLÀCEAE

Leafy plants, terrestrial or rooted in mud, never very large; stems branching; leaves small and 4–6-rowed; sporangia one-celled, solitary, axillary or borne on the upper surface of the leaf at its base and enwrapped in its margins, some containing large spores (macrospores) and others small spores (microspores). The macrospores are in the shape of a low triangular pyramid with a hemispherical base, and marked with elevated ribs along the angles. In germination they develop a minute prothallus which bears archegonia to be fertilized by antherozoids developed from the microspores.

1. SELAGINÉLLA Beauv.

Fructification of two kinds, namely, of minute and oblong or globular sporecases, containing reddish or orange-colored powdery microspores; and of mostly 2-valved tumid larger ones, filled by 3 or 4 (rarely 1–6) much larger globose-angular macrospores; the former usually in the upper and the latter in the lower axils of the leafy 4-ranked sessile spike, but sometimes the two kinds on opposite sides all along the spike. (Name a diminutive of *Selago*, an ancient name of a *Lycopodium*, from which this genus is separated, and which the plants greatly resemble in habit and foliage.)

* *Leaves all alike and uniformly imbricated; those of the spike similar.*

1. **S. selaginoìdes** (L.) Link. *Sterile stems prostrate* or creeping, small and slender; *the fertile thicker, ascending, simple* (3–8 cm. high); *leaves lanceolate, acute, spreading, sparsely spinulose-ciliate.* (*S. spinosa* Beauv.) — Wet places, Nfd. to N. H. (*Pursh*), Mich., L. Superior, Col., and northw.; rare. — Habit of *Lycopodium inundatum.* Leaves larger on the fertile stems, yellowish-green. (Eu.)

2. **S. rupéstris** (L.) Spring. *Much branched in close tufts* (2–6 cm. high); *leaves densely appressed-imbricated, linear-lanceolate,* convex and with a grooved keel, *minutely ciliate, bristle-tipped;* those of the strongly quadrangular spike rather broader. — Dry and exposed rocks, somewhat local but not rare. — Grayish-green in aspect, resembling a rigid moss. (Eurasia.)

* * *Leaves shorter above and below, stipule-like ; the lateral larger, 2-ranked.*

3. S. àpus (L.) Spring. Stems tufted and prostrate, creeping, much branched, flaccid ; leaves pellucid-membranaceous, the larger spreading horizontally, ovate, oblique, mostly obtuse, the smaller appressed, taper-pointed ; those of the short spikes nearly similar ; larger spore-cases copious at the lower part of the spike. — Low, shady places, s. Me., southw. and westw. — A delicate little plant, resembling a Moss or *Jungermannia*. (S. A.)

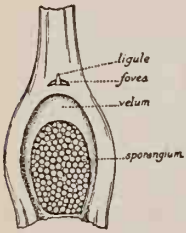
ISOËTÀCEAE (Quillwort Family)

(Revised by A. A. Eaton.)

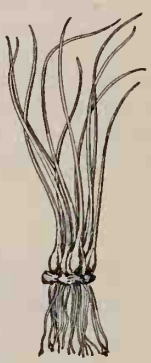
Small aquatic or palustrine herbs of grass-like or rush-like aspect. Stem short, thick, and corm-like, crowned with numerous subulate leaves. Spores of two kinds in distinct axillary solitary sporangia. — A single genus ; the species similar in habit and to be distinguished with certainty only by the aid of the compound microscope.

1. ISÒËTES L. Quillwort

Stem fleshy, more or less depressed, the roots arising from the 2–5-lobed base, the flattened top bearing the leaves from a central bud or crown. Leaves dilated and imbricated at base, rounded or somewhat angular above, orbicular in section, traversed by four air-tubes that are separated by cross-partitions, bearing a bast-bundle in the center and often 4 or more in the periphery. Stomata none or in narrow bands over the air-cavities. Sporangia in excavations of the dilated bases of the leaves (more or less covered by the *velum*, formed from the thin edges of the excavation), attached by their backs, orbicular to ovoid, plano-convex, traversed internally by transverse threads, their thin integuments often bearing small dark sclerenchymatous cells. Spores dimorphous, the female or gynospores large (250–1000 μ or more in diameter), spherical, with an elevated ridge (equator) around the middle and three others (commissures) arising from this and meeting at the summit of the upper hemisphere, the surface variously beset with siliceous elevations, rarely smooth ; the male or androspores in separate sporangia, mostly in alternate cycles with the female, very minute (20–45 μ long), obliquely oblong, triangular in section. The trunks of all our species but *I. Tuckermani* and *I. saccharata*, var. *Amesii* are habitually bilobed. (Name used by Pliny, presumably for a house-leek.) Figs. 23, 24.



23. Isoëtes (diagrammatic). Inner surface of leaf-base.


24. I. riparia, showing generic habit × ⅓.

§ 1. Submersed ; leaves cylindrical, fleshy, without bast-bundles or stomata. — Aquáticae A. Br. *a*.
  a. Leaves stout, rigid, erect.
    Gynospores honeycomb-reticulated below . . . . . 1. *I. macrospora*.
    Gynospores with distinct or anastomosing crests (1) *I. macrospora*, v. *heterospora*.
  a. Leaves mostly slender and spirally spreading or recurved *b*.
    b. Gynospores with thin jagged honeycomb-reticulated crests.
      Leaves 1 mm. or less in diameter.
        Leaves reddish or olive, often with a few stomata ; spores 600 μ or less in diameter . . . . . 2. *I. Tuckermani*.
        Leaves green, recurved at end, not spiral ; spores averaging 650 μ in diameter . . . . . (2) *I. Tuckermani*, v. *borealis*.
      Leaves 2.5–3 mm. in diameter . . . . . (2) *I. Tuckermani*, v. *Harveyi*.
    b. Gynospores with thick vermiform free or anastomosing ridges . . 3. *I. hieroglyphica*.
§ 2. Plants of inundated shores or tidal flats, fruiting as the water recedes ; with stomata but no bast-bundles. — Amphíbiae A. Br. *c*.

c. Leaves reddish or olive-green.
Gynospores averaging 440 μ in diameter, with small pits . . 4. *I. foveolata.*
Gynospores averaging 510 μ in diameter, with thin irregular walls . . . . . (4) *I. foveolata*, v. *plenospora.*
c. Leaves green *d.*
d. Gynospores with jagged crests.
Gynospores averaging 600 μ in diameter; crests tall, mostly simple . . . . . 5. *I. riparia.*
Gynospores averaging less than 550 μ in diameter; crests low, simple or reticulated.
Leaves 1–2.5 mm. in diameter; trunks 2-lobed . . . 6. *I. saccharata.*
Leaves 1–1.5 mm. in diameter; trunks 2-5-lobed (6) *I. saccharata*, v. *Amesii*
d. Gynospores with slender or jagged spines.
Leaves short, stout, spreading . . . . . 7. *I. echinospora*, v. *Braunii.*
Leaves long, fine, spiral . . . . . (7) *I. echinospora*, v. *muricata.*
§ 3. Plants of the extreme edges of ponds or streams, emersed most of the summer, with stomata and bast-bundles. — PALÚSTRES A. A. Eaton *e.*
e. Bast-bundles 4, one at each front angle and one at each end of the dorsi-ventral partition *f.*
f. Polygamous; androsporangia rare; gynospores appearing abortive.
Bast-bundles often absent; gynospores with labyrinthiform ridges . . . . . 8. *I. Eatoni.*
Bast-bundles always present; gynospores with truncate columns . . . . . 9. *I. Gravesii.*
f. Monoecious.
Gynospores with coarse irregular crests.
Crests loose; sporangia slightly spotted . . . . . 10. *I. Dodgei.*
Crests crowded; sporangia densely spotted . . (10) *I. Dodgei*, v. *Robbinsii.*
Gynospores reticulated.
Plants of medium size; androspores smooth . . . 11. *I. Engelmanni.*
Plants large; androspores spinulose . . . . (11) *I. Engelmanni*, v. *valida.*
e. Bast-bundles 4, with accessory ones in the periphery.
Monoecious; gynospores crested, somewhat reticulated (11) *I. Engelmanni*, v. *fontana.*
Polygamous; gynospores small, smooth or with low tubercles or wrinkles . . . . . 12. *I. melanopoda.*
§ 4. Plants of dry situations; leaves setaceous; bast-bundles 4; stomata many; velum none. — TERRÉSTRES A. Br. . . . . 13. *I. Butleri.*

1. **I. macróspora** Dur. Leaves 10–30, 2 mm. in diameter, erect, round, dark green, rather blunt; velum covering $\frac{1}{3}$ of the unspotted sporangium; gynospores 600–800 μ in diameter, the upper faces traversed by thin parallel walls, the lower hemisphere reticulated; androspores 36–47 μ (average 42 μ) long, smooth. — Gaspé Co., Que., and Me. to Ont. and Minn. FIG. 25.

25. I. macrospora Gynospore × 15.

Var. **heteróspora** A. A. Eaton. Leaves 50–150, 2 mm. in diameter, 5–8 cm. long, rigid, erect, tapering to a sharp point; sporangia spotted $\frac{1}{3}$–$\frac{2}{3}$ indusiate; gynospores 540–675 μ (some abnormally 1100–1134 μ) in diameter, densely covered with thick jagged convoluted crests, often reticulated below; androspores 30–40 μ (average 35 μ) long, dark brown, papillose. (*I. heterospora* A. A. Eaton.) — Jordan Pond, Mt. Desert, Me.

2. **I. Tuckermàni** A. Br. Trunk often 3-lobed, small; leaves 10–40, 1 mm. or less in diameter, 4–15 cm. long, reddish or olive green, sometimes with a few stomata but no bast-bundles; sporangia small, rarely spotted, $\frac{1}{3}$ or more covered by the velum; gynospores 450–750 μ (average 600 μ) in diameter, parallel-walled or reticulated above, more or less reticulated below; androspores 25–38 μ (average 30 μ) long, slightly rough. — Sandy ponds, Me. to Ct.

Var. **boreàlis** A. A. Eaton. Trunk bilobed; leaves 10–100, 3–25 cm. long, 1–1.5 mm. thick, green or reddish, straight or recurved; stomata none; gynospores 600–785 μ in diameter, more coarsely reticulated; androspores 42 μ long, finely spinulose. — N. Y. to N. H. and Lab.

Var. **Harvèyi** (A. A. Eaton) Clute. Trunk 2-lobed, 1.6–3 cm. in diameter; leaves 50–140, purple-bronze, 2.5–3 mm. in diameter, 5–6 cm. long, strongly recurved; stomata none; sporangia unspotted, $\frac{1}{4}$–$\frac{1}{3}$ covered by the velum; gynospores 526–648 μ (average 560 μ) in diameter; androspores 30–39.6 μ (average 34 μ) long. (*I. Harveyi* A. A. Eaton.) — N. Y. and Mass. to Nfd.

3. **I. hieroglýphica** A. A. Eaton. Leaves 10–20, 6–7.5 cm. long, 1–2 mm. in diameter, blunt, recurved; sporangia not spotted, $\frac{1}{3}$ covered by the velum;

gynospores 486–720 μ (average 600 μ) in diameter, sparingly covered with thick vermiform subconfluent or reticulated ridges except just beneath the equator; androspores 31–44 μ (average 36 μ) long, verrucose. — Ponds and lakes, N. S., Que., and Me. Fig. 26.

26. I. hieroglyphica. Gynospore × 15.

4. I. foveolàta A. A. Eaton. Polygamous; leaves 50–150, 5–15 cm. long, 2 mm. in diameter, round, pinkish or olive-green; sporangia thickly dark-spotted, $\frac{1}{5}$–$\frac{1}{3}$ covered by the velum; gynospores 380–560 μ (average 440 μ) in diameter, the lower surface covered with little holes, the upper a little more open; androspores 22–35 μ long, reticulated or papillose. — Ponds and river borders; N. H. and Ct. Fig. 27.

27. I. foveolata. Gynospore × 15.

Var. plenóspora A. A. Eaton. Leaves 30–110, 1.5 mm. in diameter, 20–40 cm. long; sporangia thickly dark-spotted, $\frac{1}{4}$–$\frac{1}{2}$ covered by the velum; gynospores white or ashy, 450–600 μ (average 510 μ) in diameter, covered with tall thin mostly honeycomb-reticulated walls; androspores 27–33 μ long, finely granular or tuberculate. — Gravelly shores of ponds in a thin layer of silt, s. e. Mass.

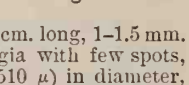
5. I. ripària Engelm. Often polygamous; leaves 10–30, 1–3 mm. in diameter, 10–25 cm. long, erect, dark green; sporangia densely spotted, $\frac{1}{4}$–$\frac{2}{3}$ covered by the velum; gynospores 450–756 μ (averaging 570 μ) in diameter, covered with high isolated, united, or reticulated jagged crests; androspores 28–32 μ (average 29 μ) long, sparingly tubercled. — Tidal shores of Del. R., in gravel. — A species misinterpreted in the past, and seemingly of restricted range.

6. I. saccharàta Engelm. Leaves 10–30, 1–2.5 mm. in diameter, 3–25 cm. long, spreading or recurved; velum very narrow to half covering the thickly spotted sporangium; gynospores 420–510 μ (average 480 μ) in diameter, covered with low granules, reticulated walls or tall rough crests; androspores 22–30 μ (average 28 μ) long, sparingly papillose. — Fresh-water tidal flats, n. arm of Chesapeake Bay and Del. R. — Very variable and closely approaching the last in some of its forms.

Var. Amèsii A. A. Eaton. Trunks 2–5-lobed; leaves 8–30 cm. long, 1–1.5 mm. in diameter, slender, finely pointed, quadrangular; sporangia with few spots, $\frac{1}{3}$–$\frac{2}{3}$ covered by the velum; gynospores 420–600 μ (average 510 μ) in diameter, marked with fine granules and thin short often reticulated walls; androspores 28–32 μ long. — Gravelly shores overlaid by fine silt, chiefly in shallow water, s. Mass. to N. Y.

7. I. echinóspora Dur. Leaves 10–30, 5–15 cm. long, 1.5–2 mm. broad, dark green, finely pointed; velum about one half covering the sporangium; gynospores 350–560 μ (average 500 μ) in diameter, covered with simple or forked spinules; androspores 26–30 μ long, smooth. — Eu. — A species represented in America by the following varieties.

Var. Braúnii (Dur.) Engelm. Differs from the type in having stomata on the leaves, a broader velum, spotted sporangium, and not rarely broad jagged crests on the gynospores. (Var. *robusta* Engelm.; *I. Boottii* A. Br.) — Muddy or sandy river and pond borders, Gaspé Co., Que. to B. C., s. to Cal. and Pa.; variable. Fig. 28.



28. I. echinospora, v. Braunii. Gynospore × 15.

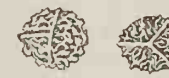
Var. muricàta (Dur.) Engelm. Submersed leaves 10–30, flaccid, spiral, 15–40 cm. long, 1 mm. in diameter; emersed ones 5–8 cm. long, slender, recurved; sporangia pale-spotted, $\frac{1}{2}$–$\frac{2}{3}$ indusiate; gynospores 400–620 μ (average 510 μ) in diameter, covered with slender round spines and flat, blunt, or retuse lamellae; androspores 25–31 μ long, smooth or slightly granular. — Firm soil in shallow waters, mostly submersed; N. S. to n. Me. and N. J. — Grades into the last.

8. I. Eatòni Dodge. Polygamous; leaves 30–200, 40–70 cm. long, 3–4 mm. in diameter, flat above; stomata abundant; bast-bundles usually present; velum very narrow; sporangia densely light-brown spotted, not filled by spores; gynospores round below, upper half depressed, 300–450 μ (average 390 μ) in diameter, with labyrinthiform-convolute ridges; androsporangia very rare,

usually scattered among the gynosporangia, the spores 25–30 μ (average 28 μ) long, minutely tuberculate. — Borders of ponds and streams, s. N. H. to N. J. — Our largest species.

9. I. Gravèsii A. A. Eaton. Polygamous; leaves 20–150, 12–30 cm. long, 2–3 mm. in diameter, erect, reddish or dark green; sporangia with an abundance of light brown cells, $\frac{1}{5}$–$\frac{1}{3}$ covered by the velum; gynospores 351–405 μ in diameter, the upper hemisphere depressed, covered with short truncate single columns; androspores 22–30 μ (average 26 μ) long, high-cristate or tuberculate. — Mass. to Ct.

10. I. Dódgei A. A. Eaton. Leaves 10–75, the submersed 20–45 cm. long, 1.5–2 mm. wide, erect or spiral; emersed 10–15 cm. long, interlaced; stomata many; bast-bundles usually present; sporangia sprinkled with light cells, $\frac{1}{5}$–$\frac{1}{4}$ covered by the velum; gynospores 500–675 μ (average 560 μ) in diameter, sparsely beset with irregular often anastomosing walls; androspores 22–44 μ (average 32 μ) long, wrinkled. (*I. riparia*, var. *canadensis* Engelm.; *I. canadensis* A. A. Eaton.) — Firm soil, borders of ponds and streams, Me. to B. C., southw. to Pa. Fig. 29.


29. I. Dodgei. Gynospore × 15.

Var. Robbínsii A. A. Eaton. Leaves 15–30, 10–38 cm. long, 1–1.5 mm. wide, dark green, rigidly erect, fine-pointed; sporangia $\frac{1}{5}$–$\frac{1}{3}$ indusiate, covered with brown cells; gynospores 460–600 μ (average 500 μ) in diameter, thickly beset with anastomosing jagged walls; androspores 28.7–32.8 μ long, rough or slightly papillose. (*I. canadensis*, var. *Robbinsii* A. A. Eaton.) — Borders of ponds and streams, s. Mass. to N. Y.

11. I. Engelmánni A. Br. Leaves 10–40, 1–4 dm. long, 1–2 mm. in diameter, light green; sporangia unspotted, $\frac{1}{4}$ or less indusiate; gynospores 350–570 μ (average 450 μ) in diameter, honeycomb-reticulated with thin walls; androspores 24–29 μ long, smooth. — Ponds, streams, and ditches, mostly in clay, N. H. and Vt. to Pa. and Mo; mostly near the coast. Fig. 30. Var. GRÁCILIS Engelm. is an attenuate form in shade or deep water.

30. I. Engelmanni. Gynospore × 15.

Var. válida Engelm. Plants larger; leaves 50–100, 3–6 dm. tall, 2–3 mm. wide, often with 6 bast-bundles; sporangia $\frac{1}{3}$–$\frac{2}{3}$ indusiate; gynospores 320–570 μ (average 480 μ) in diameter, androspores 24–30 μ (average 28 μ) long, blunt-spinulose. — N. J. to Va.

Var. fontàna A. A. Eaton. Trunk 1–2 cm. in diameter; leaves 30–50, 15–20 cm. long, 2 mm. wide, erect, with many stomata and six large and several small bast-bundles, velum narrow; sporangia sparingly spotted with light-brown cells; gynospores 400–750 μ (average 500 μ) in diameter, covered with coarser more or less broken alveolations; androspores as in the type. — Pa. and Va.; local.

12. I. melanópoda J. Gay. Polygamous; leaves 15–60, 1.5–3.5 mm. broad, 12–45 cm. tall, chestnut or black at base, with numerous peripheral bast-bundles; sporangia less than $\frac{1}{5}$ indusiate, thickly spotted; gynospores 250–400 μ (average 330 μ) in diameter, nearly smooth or with low often confluent tubercles; androspores 23–30 μ (average 25 μ) long, spinulose. — Inundated fields and shallow ponds, Ill. and Ia. to Okl. and Cal. Fig. 31. Variety PÁLLIDA Engelm. of the Southwest, occasionally found mixed with the type in our range, differs only in having pale leaf-bases.

31. I. melanopoda. Gynospore × 15.

13. I. Butlèri Engelm. Dioecious; leaves 8–60, 1.5–22 cm. long, 0.5 mm. in diameter, rigid, triangular-setaceous, with wide dissepiments, narrow air-canals, and four stout bast-bundles; sheaths granular on the backs; velum none or very narrow; sporangia mostly spotted; gynospores 400–630 μ (average 570 μ) in diameter, roughened with very small warts or fragmentary crests; androspores 28–34 μ long, coarsely tubercled. — Moist hillsides and shallow depressions, Ill. and Kan. to Tenn. and Okl. Fig. 32. Var. IMMACULÀTA Engelm. is a form without spots on the sporangia, growing with the typical form of the species.

32. I. Butleri. Gynospore × 15.

Division II. SPERMATÓPHYTA

(Seed-Plants, Phanerogamia, or Flowering Plants)

Male generative cells (with rare extra-limital exceptions) passive, developing an elongated tube. Flowers with stamens, or pistils, or both. Normal reproduction by seeds containing an embryo or minute plant.

TAXÀCEAE (Yew Family)

Trees or shrubs, ours with evergreen linear leaves, and dioecious (or more rarely monoecious) *flowers* (borne on short scaly peduncles), *the sterile globular, formed of a few naked stamens with anther-cells under a shield-like somewhat lobed connective, the fertile consisting of an erect ovule, which becomes a bony-coated seed more or less surrounded by a large fleshy disk* (or scale). Now generally treated as a family distinct from the *Pinaceae.*

1. TÁXUS [Tourn.] L. Yew

Annular disk of the fertile flowers cup-shaped, globular, at length pulpy, red, and berry-like. Cotyledons 2. — Leaves flat, mucronate, rigid, scattered, 2-ranked. (The classical name, probably from τόξον, *a bow*, the wood anciently used for bows.)

1. **T. canadénsis** Marsh. (American Y., Ground Hemlock.) A low straggling bush; stems diffuse (or rarely arborescent and 2 m. high); leaves linear, green on both sides. — Evergreen woods, Nfd. to Va., Ia., and Man.

PINÀCEAE (Pine Family)

Trees and shrubs, with resinous juice, mostly awl-shaped or needle-shaped entire leaves, and monoecious or rarely dioecious flowers borne in or having the form of scaly catkins, of which the fertile become cones or berry-like. Ovules 2 or more at the base of each scale. Mostly evergreen. In the following treatment the term *catkin* (or ament) is retained as the most convenient designation for the catkin-like aggregates of scales bearing or inclosing either stamens or ovules. The morphology of the coniferous inflorescence is still doubtful. It seems probable that the staminate catkin is a single flower, but paleophytological evidence suggests that the ovule-bearing cones are inflorescences.

Tribe I. ABIÈTEAE. Fertile flowers consisting of numerous open spirally imbricated carpels in the form of scales, each scale in the axil of a persistent bract; in fruit forming a cone. Ovules 2, adherent to the base of each scale, inverted. Seeds winged. Cotyledons 3–16. Anthers spirally arranged upon the stamineal column, which is subtended by involucral scales. Buds scaly. Leaves linear to needle-shaped.

* Leaves in bundles of two or more.

1. **Pinus.** Leaves 2–5 in each bundle, evergreen.
2. **Larix.** Leaves many in each cluster, deciduous.

** Leaves solitary.

+ Leaves keeled on both surfaces (tetragonal); scales of the cone persistent upon the axis.

3. **Picea.** Leaves not 2-ranked.

+ + Leaves flattish, whitened along two lines beneath.

4. **Abies.** Cone large (5–10 cm. long), the scales falling away before the axis.
5. **Tsuga.** Cone small (12–35 mm. long), the scales persisting on the axis.

Tribe II. TAXODÌEAE. Fertile flowers of several spirally arranged imbricated scales without bracts, becoming a globular woody cone. Ovules 2 or more at the base of each scale, erect. Leaves linear, alternate; leaf-buds not scaly.

6. Taxodium. Seeds 2 to each scale. Leaves 2-ranked, deciduous.

Tribe III. CUPRÉSSEAE. Scales of the fertile flower few, decussately opposite or ternate, becoming a small closed cone or sort of drupe. Ovules 2 or more in their axils, erect. Cotyledons 2 (rarely more). Leaves decussately opposite or ternate, usually scale-like and adnate, the earlier free and subulate; leaf-buds not scaly.

* Monoecious; fruit a small cone; leaves opposite and more or less 2-ranked.

7. Chamaecyparis. Cone globose; scales peltate. Seeds 1 or 2, narrowly winged.

8. Thuja. Cone pendulous, ellipsoid, of 8–12 imbricated scales. Seeds 2, 2-winged.

* * Dioecious; fruit berry-like, with bony ovate seeds.

9. Juniperus. Fruit-scales 3–6, coalescent. Foliage not 2-ranked.

1. PÌNUS [Tourn.] L. Pine

Filaments short; connective scale-like; anther-cells 2, opening lengthwise. Pollen of 3 united cells, the 2 lateral ones empty. Fruit a cone formed of the imbricated woody scales, which are persistent, spreading when ripe and dry; the 2 nut-like seeds partly sunk in excavations at the base of the scale. Cotyledons 3–12, linear. — Primary leaves thin and chaff-like, merely bud-scales; from their axils immediately proceed the secondary needle-shaped evergreen leaves, in fascicles of 2 to 5, from slender buds, some thin scarious bud-scales sheathing the base of the cluster. Leaves when in pairs semicylindrical, becoming channeled; when more than 2 triangular; their edges in our species serrulate. Blossoms developed in spring; the cones maturing in the second autumn. (The classical Latin name.)

Leaves 5 in a fascicle; cone-scales thin . . . . . 1. *P. Strobus.*
Leaves 2–3 in a fascicle; cone-scales thickened at the end.
  Cone-scales unarmed.
    Leaves 9–16 cm. long; sheath 8–21 mm. long . . . . . 10. *P. resinosa.*
    Leaves 4.5–6 cm. long; sheath 2–5 mm. long; resin-ducts in each leaf numerous, peripheral or nearly so . . . . . 9. *P. sylvestris.*
    Leaves 1.5–4 cm. long; resin-ducts mostly 2, deeply embedded in the leaf-tissue . . . . . 7. *P. Banksiana.*
  Cone-scales armed with a sharp dorsal spine or prickle.
    Cone very large, 15–25 cm. long . . . . . 11. *P. palustris.*
    Cone 3–12 cm. long.
      Spine of cone-scales stout, 5–6 mm. long . . . . . 5. *P. pungens.*
      Spine of cone-scales smaller, 1–3 mm. long.
        Leaves somewhat rigid, 1.8–3 mm. broad.
          Leaves in 2's, 1.5–4 cm. long . . . . . 7. *P. Banksiana.*
          Leaves in 3's, 5–12 cm. long . . . . . 3. *P. rigida.*
          Leaves in 3's, 15–25 cm. long . . . . . 4. *P. serotina.*
        Leaves flaccid, 0.7–1.5 mm. broad.
          Old cones when open subcylindric-ovoid, about 10 cm. long, usually shining . . . . . 2. *P. Taeda.*
          Old cones when open broadly ovoid, 4–7 cm. long, dull.
            Spine of cone-scale 2–3 mm. long; leaves in 2's, 4–8 cm. long . 6. *P. virginiana.*
            Spine of cone-scale minute, about 1 mm. long; leaves in 2's or 3's, 7–13 cm. long . . . . . 8. *P. echinata.*

1. P. Stròbus L. (White P.) Tree 20–50 m. high; *leaves in 5's*, very slender, glaucous; sterile flowers oval (8–10 mm. long), with 6–8 involucral scales at base; fertile catkins long-stalked, cylindrical; cones narrow, cylindrical, nodding, often curved (1–1.5 dm. long); seed smooth; cotyledons 8–10. — Nfd. to Pa., along the mts. to Ga., west to Man. and e. Ia.

2. P. Taèda L. (Loblolly or Old-Field P.) *Leaves long* (14–23 cm.), in 3's or sometimes 2's, *with elongated sheaths*, light green; *cone-scales tipped with a stout incurved spine.* — Wet clay, or dry sandy soil, s. N. J. to Fla., near the coast, thence to Tex. and Ark. — A tree 15–45 m high; staminate flowers slender, 5 cm. long, usually with 10–13 involucral scales; seeds with 3 strong rough ridges on the under side.

3. P. rígida Mill. (Pitch P.) *Leaves* (5–12 cm. long) dark green, *from short sheaths;* cones ovoid-conical or ovoid (3–9 cm. long), often in clusters; *scales with a short stout generally recurved prickle.* — Sandy or barren soil, N. B. to L. Ontario, e. Tenn., and n. Ga. — A tree 10–25 m. high, with very rough dark bark and hard resinous wood; sterile flowers shorter; scales 6–8.

4. P. serótina Michx. (Pond or Marsh P.) Similar to the last but readily distinguished by its *much longer leaves* (15–25 cm. in length) *and sheaths*, as well as the short more deciduous prickles of the cone. — Coastal swamps, Va. (*Harper*) to Fla.

5. P. púngens Lamb. (Table Mountain P.) *Leaves stout, short,* in 2's or 3's (3–6 cm. long), crowded, bluish; the sheath short (very short on old foliage); *the scales armed with a strong hooked spine.* — Allegheny Mts., N. J. and Pa., to Ga. and Tenn. — A rather small tree (6–18 m. high); cones long-persistent.

6. P. virginiàna Mill. (Jersey or Scrub P.) *Leaves short* (4–8 cm. long), in 2's; cones sometimes curved, *the scales tipped with a straight or recurved awl-shaped prickle.* (*P. inops* Ait.) — Barrens and sterile hills, L. I. to S. C., Ala., and s. Ind. — A straggling tree (5–12 m. high), with spreading or drooping branchlets; larger westward. Young shoots with a purplish glaucous bloom.

7. P. Banksiàna Lamb. (Gray or Northern Scrub P.) *Leaves* in 2's, very short and thick (usually 2–3 cm. long), *oblique, divergent;* cones conical, oblong, usually curved (4–5 cm. long), smooth, the scales pointless, or with a minute obsolescent prickle. (*P. divaricata* auth.) — Barren, sandy, or rocky soil, N. S. to n. N. Y., w. to n. Ill., Minn., and northw. — A low tree, usually 5–10 (rarely 20) m. high.

8. P. echinàta Mill. (Yellow P.) *Leaves* in 2's or 3's, *slender*, mostly about 1 dm. long, with long sheaths; *cone-scales with a minute weak prickle.* (*P. mitis* Michx.) — Usually dry or sandy soil, Staten I. to Kan., and southw. — A straight tree (15–30 m. high), with dark green leaves more soft and slender than the preceding. The western form has more rigid leaves and more tuberculate and spiny cones.

9. P. sylvéstris L. (Scotch P., Scotch Fir.) Leaves in 2's, dark green; cones 4–6 cm. long, *the thickened rhombic scales with central tubercle but not spinous.* — Much cultivated, and thoroughly naturalized at some points on the N. E. coast. — A valuable long-lived tree attaining considerable height, but the trunk rarely straight, the bark gray. (Nat. from Eu.)

10. P. resinòsa Ait. (Red P.) Leaves in 2's, dark green; *cones* ovoid-conical, smooth (*about 5 cm. long*), *their scales slightly thickened, pointless;* sterile flowers oblong-linear (12–18 mm. long), subtended by about 6 involucral scales which are early deciduous by an articulation above the base. — Dry woods, Mass. to n. Pa., Mich., and Minn., and northw. — A tall tree, with reddish rather smooth bark and hard wood, not very resinous.

11. P. palústris Mill. (Long-leaved, Yellow, or Georgia P.) *Leaves* in 3's from long sheaths, *very long*, crowded at the summit of very scaly branches; sterile flowers 6–8 cm. long, rose-purple; *cones large*, cylindrical or conical-cylindric, *the thick scales armed with a short recurved spine.* (*P. australis* Michx.) — Sandy soil, s. Va. to Fla. and Tex. — A large tree, with thin-scaled bark and exceedingly hard and resinous wood.

2. LÀRIX [Tourn.] Adans. Larch

Catkins lateral, terminating short spurs on branches of a year's growth or more, short or globular, developed in early spring; the sterile from leafless buds; the fertile mostly with leaves below. Anther-cells opening transversely. Pollen-grains simple, globular. Cone-scales persistent. — Leaves needle-shaped, soft, deciduous, very many in a fascicle, developed in early spring from lateral scaly and globular buds. Fertile catkins crimson or red in flower. (The ancient name.)

1. **L. laricìna** (DuRoi) Koch. (American or Black L., Tamarack, Hackmatack.) Leaves 1–2.5 cm. long; cones ovoid, 1.2–2 cm. long, of few rounded scales. (*L. americana* Michx.) — Chiefly in cold swamps, Lab. and Nfd. to n. Pa., n. Ill., centr. Minn., and far northw. — A slender tree (8–30 m. high), with hard and very resinous wood.

2. **L. decídua** Mill. (*L. europaea* DC.), with longer leaves and larger cones, is often cultivated, and occasionally established, as in Ct. (*Bissell*). (Introd. from Eu.)

3. PÍCEA Link. Spruce

Sterile flowers on branchlets of the preceding year; anthers tipped with a rounded recurved appendage, their cells opening lengthwise. Cones maturing the first year, becoming pendulous; their scales thin, not thickened nor prickly-tipped, persistent. — Leaves scattered, needle-shaped and keeled above and below (4-sided), pointing every way. Otherwise nearly as in *Pinus*. (The classical Latin name of a pine.)

1. **P. canadénsis** (Mill.) BSP. (White or Cat S.) *Branchlets glabrous;* leaves slender, pale or glaucous; *cones cylindrical,* about 5 cm. long, *deciduous,* the thin scales with an entire edge. (*P. alba* Link.) — N. S. and N. B. to N. Y., L. Superior and northw. — A handsome tree (15–45 m. high), in aspect resembling the *Balsam Fir.*

2. **P. rùbra** (DuRoi) Dietr. (Red S.) *Branchlets pubescent; leaves* mostly slender, 12–15 mm. long, usually acute or acutish, *dark green or yellowish green; cones elongated-ovoid,* mostly 3–4 cm. long, *clear brown or reddish brown,* the scales rounded, entire or slightly erose. (*P. rubens* Sarg.; *P. australis* Small.) — Rocky upland woods, Nfd. to Pa., s. in the Alleghenies to Ga., w. to Minn., and northw. — A valued timber tree, 20–35 m. high.

3. **P. mariàna** (Mill.) BSP. (Black or Bog S.) *Branchlets pubescent; leaves* short and thickish, mostly 6–10 (rarely 13) mm. long, *pale bluish green,* with strong whitish bloom; *cones short-ovoid or subglobose,* 2–3 cm. long, *dull grayish brown,* persisting for several years; the scales more decidedly erose, rounded or often somewhat narrowed toward the apex. (*P. nigra* Link; *P. brevifolia* Peck.) — Cold bogs and mountain slopes, Nfd. to N. J., along the Great Lakes and northw. — Chiefly a low tree (8–12 m.) rarely attaining 30 m. in height.

4. **P. Àbies** (L.) Karst. (*P. excelsa* Link), the Norway S., often cultivated as a shade tree, and now established (acc. to *Bissell*) at several places in Ct., has subglabrous branchlets, slender sharp-pointed dark green glossy leaves, and large cones (1–1.5 dm. long). (Introd. from Eu.)

4. ÀBIES [Tourn.] Hill. Fir

Sterile flowers from the axils of last year's leaves; anthers tipped with a knob, their cells bursting transversely; pollen as in *Pinus*. Cones erect on the upper side of spreading branches, maturing the first year; their thin scales and bracts deciduous at maturity. Seeds and bark with balsam-bearing vesicles. — Leaves scattered, sessile, flat, with the midrib prominent on the whitened lower surface, on horizontal branches appearing 2-ranked. (The classical Latin name.)

1. **A. balsàmea** (L.) Mill. (Balsam or Balm-of-Gilead F.) Leaves narrowly linear, obtusely pointed or retuse (1–3.2 cm. long); cones cylindrical (6–10 cm. long; 2–3 cm. thick), at first violet-colored; *the bracts obovate,* serrulate, tipped with an abrupt slender point, *shorter than the scales.* — Damp woods and mt. swamps, Nfd. to Pa., along the mts. to Va., w. to centr. Ia., and northw. — A slender tree or at high elevations a low or prostrate shrub.

2. **A. Frasèri** (Pursh) Poir. Leaves narrowly linear, commonly retuse; *bracts* of the cones dentate or erose-lacerate on the margin, often emarginate and bearing a slender cusp at the apex, *longer than the scales.* — Mts. of Va., and N. C.

5. TSÙGA (Endl.) Carr. Hemlock

Sterile flowers a subglobose cluster of stamens, from the axils of last year's leaves, the long stipe surrounded by numerous bud-scales; anthers tipped with a short spur or knob, their confluent cells opening transversely; pollen-grains simple. Cones on the end of last year's branchlets, maturing the first year, pendulous; their scales thin, persistent. — Leaves scattered, flat, whitened beneath, appearing 2-ranked. (The Japanese name of one of the species.)

1. T. canadénsis (L.) Carr. *Leaves* petioled, short-linear, obtuse, 8–13 *mm. long; cones* ovoid, 1.5–2.5 *cm. long*, the *scales suborbicular.* (*Abies* Michx.) — Mostly hilly or rocky woods, N. B. and N. S. to Del., and along the mts. to Ala., w. to Minn. — A tall tree, with light and spreading spray and delicate foliage, bright green above, silvery beneath.

2. T. caroliniàna Engelm. *Leaves* petioled, linear, 15–18 *mm. long; cones* ovoid, 2–3.5 *cm. long; scales oblong*, in age loosely imbricated, widely and irregularly spreading. — Mts. of Va. to Ga.

6. TAXÒDIUM Richard. Bald Cypress

Flowers monoecious, the two kinds on the same branches. Sterile flowers spiked-panicled, of few stamens; filaments scale-like, shield-shaped, bearing 2–5 anther-cells. Fertile catkins ovoid, in small clusters, scaly, with a pair of ovules at the base of each scale. Cone globular, closed, composed of very thick and angular somewhat shield-shaped scales, bearing 2 angled seeds at the base. Cotyledons 6–9. — Trees, with light green deciduous leaves; a part of the slender leafy branchlets of the season also deciduous in autumn. (Name compounded of *τάξος*, *the yew*, and *εἶδος*, *resemblance*, the leaves being yew-like.)

1. T. dístichum (L.) Richard. Leaves linear and spreading; also some awl-shaped and imbricated on flowering branchlets. — Swamps, s. Del. to s. Ill., Mo. and Tex. March, April.

7. CHAMAECÝPARIS Spach. White Cedar. Cypress

Flowers monoecious on different branches, in terminal small catkins. Sterile flowers composed of shield-shaped scale-like filaments bearing 2–4 anther-cells under the lower margin. Fertile catkins globular, of shield-shaped scales decussate in pairs, bearing few (1–4) erect bottle-shaped ovules at base. Cone globular, firmly closed, but opening at maturity; the scales thick, pointed or bossed in the middle; the few angled or somewhat winged seeds attached to their contracted base or stalk. Cotyledons 2 or 3. — Strong-scented evergreen trees, with very small and scale-like or some awl-shaped closely appressed-imbricated leaves, distichous branchlets, and exceedingly durable wood. (From *χαμαί*, *on the ground*, and *κυπάρισσος*, *cypress.*)

1. C. thyoides (L.) B S P. (White Cedar.) Leaves minute, pale, often with a small gland on the back, closely imbricated in 4 rows; cones small (6–9 mm. in diameter) of about 3 pairs of scales; seeds slightly winged. (*C. sphaeroidea* Spach.) — Swamps, s. N. H. to Fla. and Miss. — A tree 10–25 m. high, resembling Arbor Vitae. Doubtfully indigenous in N. S., and said to have been originally collected in Canada by Kalm.

8. THÙJA L. Arbor Vitae

Flowers mostly monoecious on different branches, in very small terminal ovoid catkins. Stamens with a scale-like filament or connective, bearing 4 anther-cells. Fertile catkins of few imbricated scales (fixed by the base) each bearing 2 erect ovules; dry and spreading at maturity. Cotyledons 2. — Small evergreen trees, with very flat 2-ranked spray, and closely imbricated small appressed persistent leaves; these of two sorts, on different or successive branchlets; one awl-shaped; the other scale-like, blunt, short, and adnate to the branch. (*Θυία* or *Θύα*, the ancient name of some resin-bearing evergreen.)

1. **T. occidentàlis** L. (Arbor Vitae, White Cedar.) Leaves appressed-imbricated in 4 rows on the 2-edged branchlets; scales of the cones pointless; seeds broadly winged all round.—Swamps and cool rocky banks, e. Que. to Pa., along the mts. to N. C., west to Minn. and Man.—A tree 10–20 m. high, with pale shreddy bark, and light, soft, but very durable wood.

9. JUNÍPERUS [Tourn.] L. Juniper

Flowers dioecious, or occasionally monoecious, in very small lateral catkins. Anther-cells 3–6, attached to the lower edge of the shield-shaped scale. Fertile catkins ovoid, of 3–6 fleshy coalescent scales, each 1-ovuled, in fruit forming a sort of berry, which is scaly-bracted underneath, bluish-black with white bloom. Seeds 1–3, ovate, wingless, bony. Cotyledons 2.—Evergreen trees or shrubs. (The classical name.)

§ 1. OXÝCEDRUS Spach. *Catkins axillary; leaves in whorls of 3, free and jointed at base, linear-subulate, prickly-pointed, channeled and white-glaucous above.*

1. **J. commùnis** L. (Common J.) Arborescent, 2–4 m. high; leaves thin, straight, long and relatively narrow (12–21 mm. in length, 1.5 mm. broad at the base), widely spreading, grayish beneath, needle-pointed; berry subglobose, 6–8 mm. in diameter.—Dry soil, e. Mass. (where rare) to Pa., Man., and southw. in the mts. to N. C. and N. Mex. (Eu.)

Var. **depréssa** Pursh. Decumbent, forming large mats, 3–10 dm. high and often several m. in diameter; leaves 8–13 mm. long, straight or nearly so, sharp-pointed and with a white stripe beneath; berry 6–10 mm. in diameter. (*J. communis*, var. *canadensis* Loud.; var. *alpina* Man. ed. 6, in part.)—Common in poor, rocky soil, pastures, etc., Nfd. to Ct., along the Great Lakes and northwestw.

Var. **montàna** Ait. Very depressed and trailing; leaves short and relatively broad, curved, subappressed, 6–9 mm. long, 1.6–2 mm. broad, short-pointed, with a conspicuous white stripe beneath. (Var. *alpina Gaud.*; *J. nana* Willd.)—Exposed rocky places, coast of n. Mass. (where doubtful) to Nfd.; also in the Rocky Mts. and Alaska. (Eurasia.)

§ 2. SABÌNA Spach. *Catkins terminal; leaves mostly opposite, sometimes awl-shaped and loose, sometimes scale-shaped, appressed-imbricated and crowded, the latter with a resiniferous gland on the back.*

2. **J. horizontàlis** Moench. *A procumbent, prostrate, or sometimes creeping shrub;* scale-like leaves acutely cuspidate; *berry on short recurved peduncles*, 6–10 mm. in diameter. (*J. Sabina*, var. *procumbens* Pursh.)—Rocky or sandy banks, borders of swamps, etc., Nfd. to N. E., N. Y., n. Minn., and northw.—*J. Sabina* L., the Savin of Europe, has its scale-like leaves obtuse and more closely appressed.

3. **J. virginiàna** L. (Red Cedar or Savin.) *From a shrub to a tree 15–25 m. high*, pyramidal in form; scale-like leaves obtuse or acutish, entire; *berries on straight peduncles*, about 6 mm. in diameter.—Dry hills or deep swamps, s. Me., westw. and southw.—Bark shreddy, and heart-wood red and aromatic.

TYPHÀCEAE (Cat-tail Family)

Marsh or aquatic herbs, with nerved and linear sessile leaves, and monoecious flowers on a spadix, destitute of proper floral envelopes. Ovary 1-celled, with persistent style and elongated 1-sided stigma; cell 1-ovuled. Fruit nut-like. Seed suspended, anatropous; embryo straight in copious albumen. Root perennial.

1. TÝPHA [Tourn.] L. Cat-tail Flag

Flowers in a long and very dense cylindrical spike terminating the stem; the upper part consisting of stamens only, inserted directly on the axis, and intermixed with long hairs; the lower part consisting of stipitate 1-celled ovaries, the stipes bearing club-shaped bristles, which form the copious down of the fruit. Nutlets minute, very long-stalked. — Spathes merely deciduous bracts, or none. Rootstocks creeping. Leaves long, sheathing the base of the simple jointless stems, erect, thickish. Flowering in summer. (Τύφη, the old Greek name.)

1. T. latifòlia L. (Common Cat-tail.) Stout and tall (1–2 m. high), the flat sheathing leaves 6–23 mm. broad, exceeding the stem; the staminate and dark brown pistillate *parts of the spike* (each 8–15 cm. long or more) *usually contiguous*, the latter at length 2.5 cm. in diameter; *pistillate flowers without bractlets; stigma rhombic-lanceolate; pollen-grains in fours.* — In marshes, throughout temperate N. A. (Cosmop.)

2. T. angustifòlia L. Leaves narrower (6–12 mm. broad), somewhat convex on the back; *pistillate and staminate parts of spike usually separated by a short interval*, the fertile portion becoming 10–12 mm. in diameter; *pollen-grains simple; pistillate flowers with a linear stigma and a hair-like bractlet* slightly dilated at the summit. — S. Me. to N. C. and westw., less frequent than the preceding, and mainly near the coast. (Eurasia, etc.)

SPARGANIÀCEAE (Bur-reed Family)

Marsh or aquatic plants with alternate sessile linear 2-ranked leaves and monoecious flowers in globular sessile or pedunculate heads. Upper heads bearing sessile 3-androus naked flowers and minute scales irregularly interposed. The lower heads consisting of numerous sessile or shortly pediceled pistillate flowers with a calyx-like perianth of 3–6 linear or spatulate scales. Ovary 1–2-celled. Fruit obovoid or spindle-shaped, 1–2-seeded.

1. SPARGÀNIUM [Tourn.] L. Bur-reed

Heads scattered along the upper part of the simple or sparingly branched leafy stem, the bracts caducous or the lower persisting and leaf-like. — Perennials with fibrous roots and creeping horizontal rootstocks. Flowering through the summer. The fertile heads becoming bur-like from the divergent beaks, but the pistils at maturity falling away separately. (Name ancient, probably from σπάργανον, *a band*, in allusion to the ribbon-like leaves.)

Fertile flowers closely sessile; fruit broadly obovoid . . . . . 1. *S. eurycarpum.*
Fertile flowers shortly pedicellate; fruit fusiform.
  Beak of fruit long and slender; stigma linear.
    Pistillate heads strictly axillary.
      Mature fruits dull; stigma 1–2 mm. long . . . . . 2. *S. americanum.*
      Mature fruits lustrous; stigma 2.5–4 mm. long . . . . . 3. *S. lucidum.*
    One or more of the pistillate heads supra-axillary.
      Erect plants of muddy shores; leaf-blades translucent and reticulated 4. *S. diversifolium.*
      Distinctly aquatic; leaves with long floating opaque blades.
        Achenes rather abruptly slender-beaked; leaf-blades 1.5–4 mm. broad; stigma rarely over 1.2 mm. long . . . . . 5. *S. angustifolium*
        Achenes gradually acuminate; leaf-blades 4–9 mm. broad; stigma 1.5–2 mm. long . . . . . 6. *S. simplex.*
  Beak of fruit stouter and falcate or short and conical or none; stigma ovoid or oblong.
    Fruiting heads 2 cm. in diam.; beak gladiate-falcate . . . . . 7. *S. fluctuans.*
    Fruiting heads 1 cm. in diam.
      Beak short, conical . . . . . 8. *S. minimum.*
      Beak none, stigma sessile . . . . . 9. *S. hyperboreum.*

1. S. eurycárpum Engelm. Stems stout, erect (8–13 dm. high); leaves mostly flat and merely keeled; pistil attenuate into a short style bearing 1 or 2 elongated stigmas; fruit-heads 2–6 or more, 2–3 cm. in diameter; *fruit* angled, often

2-seeded, 7–8 mm. long when mature, *with a broad and depressed or retuse summit abruptly tipped in the center.* — Borders of ponds, lakes, and rivers, N. S. and Me., southw., and westw. to the Pacific, chiefly at low altitude.

2. **S. americànum** Nutt. Stoutish, 3–7 dm. high; *leaves thin and soft*, 6–12 *mm. broad;* bracts divaricate or arcuate-ascending; *inflorescence strictly simple; pistillate heads all axillary*, sessile or nearly so, in fruit 1.8–2.6 *cm. in diameter; fruit dull, the beak* 2.5–4 *mm. long.* (*S. simplex*, var. *Nuttallii* Engelm.) — Bogs and muddy shores, N. B. to Ia. and Va. (E. Asia.)

Var. **andrócladum** (Engelm.) Fernald & Eames. *Inflorescence bearing* from its lower axils 1–2 *weak branches.* (*S. simplex*, var. Engelm.) — Similar places, Nfd. to Minn., Mo., and Fla.

3. **S. lùcidum** Fernald & Eames. Similar, but taller (7.5–9 dm. high); *leaves firmer*, strongly carinate, much overtopping the simple or forking inflorescence; pistillate heads in maturity 3 cm. or more in diameter; *fruit lustrous, the beak* 5–7 *mm. long.* — Muddy shores, Mass. to Pa.; also Ill. and Mo.

4. **S. diversifòlium** Graebner. Erect, stoutish, 3–6 dm. high; *leaves* delicate, *cellular-reticulated*, 4–9 mm. wide, *with a broad scarious margin toward the base; heads* chiefly sessile at least the lower *supra-axillary*, in fruit 2–2.5 cm. in diameter. (*S. simplex* Man. ed. 6, in great part.) — E. Que. to Ct. and S. Dak.

Var. **acaùle** (Beeby) Fernald & Eames. Dwarf, 1–3 dm. high; pistillate heads smaller, 1.5–2 cm. in diameter, mostly crowded. (Var. *nanum* Graebner.) — Nfd. to Ia. and W. Va.

5 **S. angustifòlium** Michx. Slender *aquatic;* stems 3–12 dm. long; *leaves exceedingly long and narrow, opaque;* inflorescence simple; heads somewhat supra-axillary, the lower ones often peduncled, in fruit 1.3–2 cm. in diameter. — Ponds and slow streams, Nfd. to N. E., westw. and northw. to Ore. and Alaska.

6. **S. símplex** Huds. Coarser and in America distinctly *aquatic;* stems 3–10 dm. long; *leaves* 4–9 *mm. broad;* inflorescence simple, elongated; heads mostly supra-axillary, the lowermost long-peduncled, in fruit 2–2.5 cm. in diameter. — Nfd. and n. N. E. to Cal., and northw. (Eu.)

7. **S. flúctuans** (Morong) Robinson. Of medium size for the genus, 0.5–1 m. high; leaves 7–12 mm. broad; inflorescence branched; each of 2 or 3 branches bearing 3–5 heads, usually but 1–3 of the lowermost fertile; these at maturity 2 cm. in diameter; *nutlets with outer coat of firm texture, beaked by a persistent gladiate-falcate style, tipped with a short ovoid or oblong stigma.* (*S. androcladum*, var. *fluctuans* Morong, at least in part; *S. simplex*, var. *fluitans* Engelm.) — Margins of cool lakes, usually at a depth of about 1 m., n. N. B. and adjacent Que. to Pa. and Minn.

8. **S. mínimum** Fries. Slender, 1–4 dm. high; leaves grass-like, flat, thin, usually floating, 2–4 mm. broad; inflorescence simple; heads mostly sessile, the fertile at length 1 cm. in diameter; the *nutlets smooth, conically narrowed to a short but slender straightish beak tipped with a short ovoid or oblong stigma.* — Cold shallow water, N. B. to Pa., Mich., Col., Wash., and northw. (Eurasia.)

9. **S. hyperbòreum** Laestad. Slender, flexuous, 2–4 dm. high; leaves 1–4 mm. broad, the cauline somewhat saccate at the base; inflorescence simple; the lower heads usually peduncled, in fruit 8–10 mm. in diameter; *nutlets obovoid, rounded at the summit and tipped with a sessile short-oblong stigma.* — Cape Breton (acc. to *Macoun*) and northw. to Greenl. (N. Eurasia.)

NAJADÀCEAE (Pondweed Family)

Marsh or mostly immersed aquatic herbs, with stems jointed and leafy, leaves sheathing at base or stipulate, and flowers perfect or unisexual, often spathaceous, with perianth of 4 *or* 6 *herbaceous distinct valvate segments, or membranous and tubular or cup-shaped, or none.* Stamens 1, 2, 4, or 6, with extrorse anthers. **Ovaries 1–6, distinct, 1-celled, usually 1-ovuled, in fruit indehiscent.**

* Flowers perfect, spiked or clustered; anthers 4 or 2, sessile; leaves alternate.

1. **Potamogeton.** Spike peduncled. Sepals 4, herbaceous. Anthers 4. Ovaries 4, sessile.
2. **Ruppia.** Flowers on an inclosed spadix, at length long-exserted, without perianth. Anther cells 4, distinct. Ovaries 4, becoming stipitate.

** Flowers monoecious or dioecious, axillary, naked, monandrous; leaves opposite (alternate in n. 4).

3. **Zannichellia.** Monoecious. Pistils (2–5) from a cup-shaped involucre or sheath.
4. **Zostera.** Pistils and stamens alternate in 2 vertical rows on the inner side of a leaf-like inclosed spadix. Stigmas 2, linear. Stem creeping.
5. **Najas.** Dioecious. Pistil solitary, naked. Stamen inclosed in a membranous spathe. Stems floating, with opposite or ternate leaves.

1. POTAMOGÈTON [Tourn.] L. Pondweed.

Sepals 4, rounded, valvate in the bud. Stamens 4, opposite the sepals; anthers 2-celled. Ovaries 4 (rarely only one), with an ascending campylotropous ovule; stigma sessile or on a short style. Fruit drupe-like when fresh, more or less compressed; endocarp (*seed*) crustaceous. Embryo hooked, annular, or cochleate, the radicular end pointing downward. — Herbs of ponds and streams, with jointed mostly rooting stems, and 2-ranked leaves, which are usually alternate or imperfectly opposite; the submersed ones pellucid, the floating ones often dilated and of a firmer texture. Stipules membranous, more or less united and sheathing. Spikes sheathed by the stipules in the bud, mostly raised on a peduncle to the surface of the water. (An ancient name, composed of ποταμός, *a river*, and γείτων, *a neighbor*, from the place of growth.) — By *fruit*, the full-grown fresh or macerated fruit is intended; by *seed*, that with the fleshy outer portion or epicarp removed. All measurements are from dried specimens. The month mentioned indicates the time of ripening of the fruit.

a. Leaves of two sorts; floating ones more or less coriaceous, with a dilated petioled blade, different in form from the thinner submersed ones *b.*
- *b.* Submersed leaves filiform or very narrowly linear, at most 2 mm. wide *c.*
  - *c.* Spikes all alike, cylindrical *d.*
    - *d.* Blades of floating leaves 2.5 cm. or more long, mostly shorter than the elongate petioles; spikes 1.5 cm. or more long.
      - Seed with a depression on each side . . . . . 1. *P. natans.*
      - Seed with plane sides, not at all impressed . . . . . 2. *P. Oakesianus.*
    - *d.* Blades of floating leaves less than 1.5 cm. long, equaling or longer than the petioles; spikes less than 1 cm. long.
      - Fruit compressed, distinctly keeled, tipped by the curved style . . . . . 27. *P. Vaseyi.*
      - Fruit plump, slightly grooved on the sides, but not keeled; stigma nearly sessile . . . . . 26. *P. lateralis.*
  - *c.* Spikes of two kinds; one emersed, cylindrical, and many-flowered, the other submersed, globular, and few-flowered.
    - Peduncles of the submersed spikes equaling or exceeding the spikes . . . . . 32. *P. hybridus.*
    - Peduncles shorter than the submersed spikes . . . . . 33. *P. dimorphus.*
- *b.* Submersed leaves lanceolate to ovate, if linear more than 2 mm. wide *e.*
  - *e.* Submersed leaves linear and ribbon-like, with a broad coarsely cellular-reticulate space each side of the midrib . . . . 4. *P. epihydrus.*
  - *e.* Submersed leaves broader *f.*
    - *f.* Principal floating leaves heart-shaped at base.
      - Fruit 3–4 mm. long, compressed, and distinctly 3-keeled . . 7. *P. pulcher.*
      - Fruit 1.5–2 mm. long, plump, and obscurely 3-keeled . . 3. *P. polygonifolius*
    - *f.* Floating leaves rounded or tapering at base, not heart-shaped *g.*
      - *g.* Floating leaves 30–50-nerved . . . . . 8. *P. amplifolius.*
      - *g.* Floating leaves with fewer nerves *h.*
        - *h.* Mature fruit 2.5 mm. or more long *i.*
          - *i.* Mature spikes 4–5.5 cm. long (if rarely shorter, with floating leaves 18–24-nerved).
            - Submersed leaves mucronate . . . . . 11. *P. angustifolius*
            - Submersed leaves merely acuminate.
              - Submersed leaves broadly lanceolate or oblong-elliptical; fruit tipped by the prominent style . . 9. *P. illinoensis.*
              - Submersed leaves narrowly lanceolate; fruit tipped by the nearly sessile stigma . . . 6. *P. americanus.*

i. Mature spikes 1.5–3.5 cm. long (if rarely longer, with floating leaves 10–18-nerved).
Foliage and spikes strongly suffused with red; 3 or 4 carpels of each flower usually ripening . . . 5. *P. alpinus.*
Foliage and spikes greenish; 1 (rarely 2) carpels ripening 10. *P. heterophyllus.*
h. Mature fruit 1.5–2 mm. long . . . . . 3. *P. polygonifolius.*
i. Leaves all submersed and similar *j.*
j. Leaves lanceolate, oblong or broader *k.*
k. Leaves sessile or short-petioled, not clasping *l.*
l. Leaves finely and sharply serrulate . . . . . 18. *P. crispus.*
l. Leaves entire, but sometimes with puckered or undulate, not serrulate, margins *m.*
m. Mature spike 3.8–5.5 cm. long.
Fruit distinctly 3-keeled . . . . . 11. *P. angustifolius.*
Fruit with rounded, scarcely keeled sides . . . . 12. *P. lucens.*
m. Mature spike shorter *n.*
n. Spike more than 1 cm. long.
Foliage and spikes strongly suffused with red; 3 or 4 carpels of each flower usually ripening . . . . 5. *P. alpinus.*
Foliage and spikes greenish; 1 (rarely 2) carpels ripening 10. *P. heterophyllus.*
n. Spike 4–7 mm. long . . . . . 17. *P. mysticus.*
k. Leaves clasping or half-clasping *o.*
o. Leaves half-clasping, elongate, with rounded cucullate tips; stipules conspicuous and persistent; fruit sharply keeled . 13. *P. praelongus.*
o. Leaves cordate-clasping, if elongate with tapering plane tips; stipules inconspicuous or soon reduced to shreds; fruit rounded on the back or obtusely keeled *p.*
p. Leaves undulate or crisped, with 3–7 prominent nerves; fruit 3.5–4.5 mm. long.
Stipules 1–2 cm. long, persisting as shreds; leaves lance-attenuate . . . . . 14. *P. Richardsonii.*
Stipules short and inconspicuous; leaves from suborbicular to oblong-lanceolate . . . . . 15. *P. perfoliatus.*
p. Leaves flat, scarcely crisped, with 1 prominent nerve; fruit 2.5–3.2 mm. long; stipules, when developed, short and inconspicuous . . . . . 16. *P. bupleuroides.*
j. Leaves linear to setaceous *q.*
q. Leaves ribbon-like, 2 mm. or more wide, with a broad coarsely cellular-reticulate space each side of the midrib . . . . 4. *P. epihydrus.*
q. Leaves narrower, if occasionally 2 mm. wide, without a broad cellular-reticulate space *r.*
r. Leaves free from the stipules, or, if slightly adnate to them, bearing globose subsessile or short-stalked spikes in their axils *s.*
s. Fruit flat, cochleate; the globular spikes borne in the axils of the principal leaves.
Peduncles equaling or exceeding the spikes . . . . 32. *P. hybridus.*
Peduncles shorter than the spikes . . . . . 33. *P. dimorphus.*
s. Fruit plump; spikes terminal or borne on the uppermost branches *t.*
t. Principal leaves more than 1 mm. broad *u.*
u. Leaves with very many fine nerves.
Spikes many-flowered, in fruit 1.5–3 cm. long . . 19. *P. zosterifolius.*
Spikes 4–8-flowered, in fruit 5–8 mm. long . . . 20. *P. acutifolius.*
u. Leaves with 3–7 nerves *v.*
v. Mature fruit 3.5–4.5 mm. long.
Stipules 0.5–1 cm. long; leaves acute; spikes capitate 21. *P. Hillii.*
Stipules 1.2–2 cm. long; leaves obtuse, mucronate; spikes subcylindric-ovoid . . . . . 22. *P. obtusifolius*
v. Mature fruit 2–3 mm. long *w.*
w. Bases of the leaves bearing translucent glands; fruit plump, obscurely or bluntly keeled.
Leaves 5–7-nerved; stipules 1–2 cm. long . . 23. *P. Friesii.*
Leaves 3-nerved; stipules less than 1 cm. long . 25. *P. pusillus.*
w. Bases of leaves glandless; fruit flattened, with a thin keel or crest . . . . . (30) *P. foliosus*, v. *niagarensis.*
t. Principal leaves less than 1 mm. broad *x.*
x. Plant bearing winter-buds formed by the hardened ends of branches closely invested by imbricated leaves and stipules *y.*
y. Winter-buds borne primarily on very short axillary branches.
Leaves of the winter-buds widely divaricate . . 26. *P. lateralis.*
Leaves of the winter-buds loosely ascending . . 27. *P. Vaseyi.*
y. Winter-buds borne at the tips of elongate branches.
Leaves bristle-form, with very fine slender tips . . 28. *P. gemmiparus.*
Leaves flat or revolute, acute or short-acuminate.
Leaves rigid, revolute; winter-buds 1–2 cm. long . 24. *P. strictifolius.*
Leaves soft; winter-buds about 1 cm. long . . 25. *P. pusillus.*

w. Plant without winter-buds.
Leaves bi-glandular at base.
Stipules 1–2 cm. long, persistent . . . . . 29. *P. rutilus.*
Stipules less than 1 cm. long, scarcely persistent . 25. *P. pusillus.*
Leaves glandless at base.
Spikes short-peduncled, axillary; leaves broader than the diameter of the stems . . . . . 30. *P. foliosus.*
Spikes long-peduncled, terminal; leaves narrower than the diameter of the stems . . . . . 31. *P. confervoides*
r. Stipules united with the sheathing base of the leaf; spikes interrupted *z.*
z. Leaves at most 3 mm. wide, entire.
Stigma broad and depressed, sessile.
Stigma nearly central, the ventral face of the fruit curved; leaves filiform, taper-pointed . . . . . 34. *P. filiformis.*
Stigma nearly in line with the straightish ventral face of the fruit; leaves narrowly linear, with blunt or rounded tips . . . . . 35. *P. interior.*
Stigma capitate, tipping the definite style.
Fruit not keeled . . . . . 36. *P. pectinatus.*
Fruit prominently keeled . . . . . 37. *P. interruptus.*
z. Leaves 4–8 mm. wide, ciliate-serrulate . . . . . 38. *P. Robbinsii.*

1. P. nàtans L. *Stem simple or sparingly branched; floating leaves* 2.5–10 cm. long, elliptical or ovate, somewhat cordate at base, obtuse but with a blunt point, 21–29-nerved, *flexible at base, as if jointed* to the petiole; upper submersed leaves lanceolate, early perishing, the lower (later in the season) very slender (7–18 cm. long, barely 2 mm. wide); upper *stipules very long, acute; peduncle about the thickness of the stem;* spikes 3–6 cm. long; *fruit obliquely obovoid; sides of the turgid seed with a small deep impression in the middle;* embryo coiled into an incomplete elliptical ring. — Ponds and quiet streams, common. July–Sept. (Widely distr. in temp. and subtrop. regions.)

2. P. Oakesiànus Robbins. Stem more slender, *much branched;* floating leaves smaller (2–5 cm. long), ovate- or oblong-elliptical, obtuse, fewer (17–23)-nerved; lowest submersed ones almost capillary (barely 1 mm. wide), continuing through the flowering season; spikes shorter (1.5–3 cm. long), on *peduncles much thicker than stem;* fruit smaller and more acute; *sides of the seed not at all impressed;* curvature of the embryo nearly circular, its apex directed to a point above its base. — Ponds, and especially pools and quiet streams, local, Anticosti to n. N. Y. and N. J. July–Sept.

3. P. polygonifòlius Pourret. Stem slender, freely creeping, and sending up short leafy branches; *floating leaves* elliptic-lanceolate to cordate-ovate, rather thin, 2.5–9 cm. long, 1–4 cm. broad, 11–33-nerved, *not apparently jointed* to the petioles; submersed leaves (when present) lanceolate, short, mostly exceeding the petioles; stipules blunt, 2–4 cm. long; spikes 2–4 cm. long, very slender; *fruit* plump, 3-keeled, 1.5–2 *mm. long.* — Shallow pools, Sable I., N. S. and Nfd. Aug. (Greenl., Eurasia, Afr., Austr.)

4. P. epihỳdrus Raf. *Stems compressed,* often simple from the creeping rootstocks; *floating leaves* chiefly opposite (3–7.5 cm. long, 1–2.5 cm. broad), 11–27-*nerved,* oblong, tapering into a *short petiole,* the lower gradually narrowing and passing into the *submersed* ones, which are very numerous and approximate, conspicuously 2-ranked (5–13 cm. long, 2–6 *mm. wide*), 5–7-*nerved,* the lateral nerves slender and nearly marginal, the space within the inner nerves *coarsely cellular-reticulated; stipules very obtuse;* spikes numerous, about the length of the thickened peduncle; *fruit round-obovoid,* flattish, 3-keeled when dry, 2.5–3.5 *mm. long; seed distinctly impressed on the sides;* curvature of the embryo transversely oval. (*P. pensylvanicus* Willd.; *P. Nuttallii* C. & S.) — Still or flowing water. July–Sept.

Var. cayugénsis (Wiegand) Benn. Stouter; *floating leaves* 5–8 cm. long, 2–3.5 *cm. wide,* 29–41-*nerved; submersed* ones less distichous, 1.2–2.2 dm. long, 0.5–1 *cm. wide,* 9–13-*nerved; fruit* 3.5–4.5 *mm. long.* — N. B. and Que. to Wash., s. to centr. N. Y., Mich., and Ia. (Japan.)

5. P. alpìnus Balbis. Stems mostly simple; floating leaves (often wanting) 3.5–8 cm. long, rather thin, *wedge-oblanceolate, narrowed into a short petiole,* 11–21-nerved; *submersed leaves almost sessile,* lanceolate and lance-oblong,

smooth on the margin, fewer-nerved; stipules broad, hyaline, obtuse, upper ones acuminate; spike 1.5–3.5 cm. long, often somewhat compound; fruit obovoid, lenticular, pitted when immature, with an acute margin and pointed with the rather long style; embryo incompletely annular. (*P. rufescens* Schrad.) — In streams or ponds, Lab. to Alaska, s. to Mass., N. J., Mich., Minn., Utah, and Cal. July-Sept. (Greenl., Eurasia.)

× P. Faxòni Morong from Ferrisburg, Vt., and × P. rectifòlius Benn. from Chicago, Ill., are infertile hybrids of nos. 5 and 6.

6. **P. americànus** C. & S. Stem often branching below; *floating leaves thinnish, lance-oblong or long-elliptical*, often acute, *long-petioled*, 4–11 cm. long, 1–3 cm. wide, 17–23-nerved; *submersed leaves very long* (0.8–3 dm. long, 0.4–2.5 cm. wide), *lanceolate and lance-linear*, 7–15-nerved, coarsely reticulated; peduncles somewhat thickened upward; fruit obliquely obovoid, obscurely 3-keeled when fresh, and distinctly so when dry, the middle keel winged above and sometimes with 3–5 shallow indentations; the rounded slightly curved face surmounted by the short style; seed with the sides scarcely impressed; upper part of the embryo circularly incurved. (*P. fluitans* Man. ed. 6, not Roth; *P. lonchites* Tuckerm.) — In streams or rarely in ponds, N. B. to B. C. and southw. Aug., Sept. (Eurasia, n. Afr., W. I.)

Var. **novaeboracénsis** (Morong) Benn. Floating leaves large and thick, broadly elliptic, rounded or obtuse at apex and base, 2.5–4.5 cm. wide. — Ct. to Wisc. (Eu.)

7. **P. púlcher** Tuckerm. Stem simple (very rarely branched), black-spotted; *leaves of three kinds; floating ones* becoming very large (4.5–11) cm. long, 2–7 cm. wide), *roundish-ovate and cordate or ovate-oblong*, 25–37-nerved, *all alternate; upper submersed ones* (3–5) *usually lanceolate*, acute at base and very long-acuminate, 10–15-nerved, very thin, cellular each side of the midrib, undulate, short-petioled; *lowest* (2–4 near the base of the stem) *thicker, plane, oval or oblong* with a rounded base, or spatulate-oblong, on longer petioles; peduncles thicker than the stem; spikes 2–4 cm. long; fruit with a rounded back and angular face, pointed, distinctly 3-keeled when fresh, sharply so when dry; seed with two deep dorsal furrows, and a sinus below the angle in front; sides flat; embryo circularly much incurved above. — Ponds, local, s. Me. to Fla.; and near St. Louis, Mo. June, July.

8. **P. amplifòlius** Tuckerm. Stems simple, of very variable length; *floating leaves* (sometimes wanting) large, *oblong, lance-ovate or broadly elliptic*, abruptly acutish, 30–50-nerved, on *rather long petioles;* submersed leaves often very large (0.8–2 dm. long, 2.5–7 cm. broad), lanceolate or oval, acute at each end, *usually much recurved, undulate*, mostly on short petioles; *stipules very long and tapering to a point*, soon becoming loose; peduncles thickened upward, in deep water much elongated; spikes 3.5–8 cm. long; fruit very large (4–5.5 mm. long), rather obliquely obovoid, 3-keeled, with a broad stout beak; seed slightly impressed on the sides; upper part of the embryo curved into a ring. — Ponds and rivers, N. S. to B. C., s. to N. J., Ky., Kan., and Cal. July–Sept.

9. **P. illinoénsis** Morong. *Stem stout, branching* towards the summit; floating leaves opposite, oval or elliptic (0.5–1.5 dm. long, 4–9 cm. broad), 19–27-nerved, rounded or narrowed at base, with a short blunt point, on short petioles; *submersed leaves oblong-elliptical*, acute at each end, *usually ample* (1–2 dm. long); *stipules coarse, obtuse, strongly bicarinate* (5–7 cm. long); peduncles often clustered at the summit, thickening upward; spikes 4–5 cm. long; *fruit roundish-obovate* (3.5–4.5 mm. long), 3-keeled on the back, middle keel prominent; seed flattened and slightly impressed on the sides, obtuse or pointed at base; apex of embryo directed transversely inward. — Streams and ditches, Ill., Ia., and Minn. July, Aug.

10. **P. heterophýllus** Schreb. *Stem slender, very branching* below; floating leaves mostly thin, variable, but with a short blunt point, 9–17-nerved, 1.5–7 cm. long, 0.5–2.5 cm. wide; submersed ones lanceolate, oblanceolate or linear-lanceolate, acuminate or cuspidate, narrowed toward the base, somewhat stiffish, 2.5–8 cm. long, 0.2–1.3 cm. wide, about 7-nerved on the stem and 3-nerved on the branches; upper ones petioled, lower sessile; *stipules obtuse*, loose; pedun-

cles somewhat thickened upward, mostly less than 1 dm. long; fruit small (2.5–3 mm. long), roundish, compressed, scarcely keeled; embryo annular above. — Still or flowing water, common. July–Sept. (Greenl., Eurasia.) — Varies exceedingly in its submersed leaves, peduncles, etc. Forma GRAMINIFÒLIUS (Fries) Morong. Stems much elongated and less branched, and the flaccid linear-lanceolate submersed leaves 0.5–1.5 dm. long, 2–6 mm. wide; spikes 1.5–3 cm. long. Forma LONGIPEDUNCULÀTUS (Merat) Morong. Subsimple, the internodes very elongate (the uppermost 1–3 dm. long); submerged leaves lanceolate; peduncles 1–2.5 dm. long. — Nfd. to Ct., Mich., and westw. Forma MYRIOPHÝLLUS (Robbins) Morong. Sending up from running rootstocks many short repeatedly dichotomous and densely leafy stems; fertile stems very slender; floating leaves small, delicate, lance-oblong, on long filiform petioles; submersed stem-leaves larger, early perishing; those of the branches (deep green) linear-oblanceolate, very small (1.5–3 cm. long, 2–4 mm. wide), acute; spike slender, loosely flowered, 1.2–2.5 cm. long. — N. E. Forma MÁXIMUS Morong. Floating leaves 0.6–1.6 dm. long, 1–3 cm. wide, very acute; submersed leaves 0.5–1.6 dm. long, 0.6–1.6 cm. wide, 5–9-nerved. Forma TERRÉSTRIS Schlecht. Freely creeping in exsiccated places, producing numerous very short branches which bear tufts of oblong or oval coriaceous leaves but no fruit. — Que. and N. E.

11. **P. angustifòlius** Berchtold & Presl. Resembling *P. lucens*, but smaller, slender, much branched at base; *upper leaves coriaceous or subcoriaceous, long-petioled* and *sometimes emersed*, 0.4–1 dm. long, 1–2.5 cm. wide, 13–21-nerved; the others subsessile, all usually numerous, lanceolate or oblanceolate, *mucronate*, undulate and *crisped*, *shining*, 0.5–1.5 dm. long, 0.5–3 cm. broad, 7–17-nerved; stipules obtuse, 1.5–4 cm. long; peduncle elongated; *fruit* distinctly 3-*keeled*, 3–4 mm. long. (*P. Zizii* Mertens & Koch.) — Lakes, rarely streams, local, Mass. to Mich., westw. and southw. June–Sept. (W. I., Eurasia, Afr.) Var. CONNECTICUTÊNSIS (Robbins) Benn. Larger throughout; leaves all submersed; *fruit* 4–4.5 *mm. long*. (*P. lucens*, var. Robbins.) — Lakes, Vt., Ct., and e. N. Y.

× P. SPATHAEFÓRMIS Tuckerm. (*P. spathulaeformis* Morong) in Mystic Pond, Medford, Mass., is an infertile hybrid of nos. 11 and 10.

12. **P. lùcens** L. Stem thick, branching, sometimes very large; *leaves all submersed and similar, more or less petioled*, oval or lanceolate, *mucronate*, often crisped, *frequently shining*, 6–20 cm. long, about 13-nerved; peduncles often elongated; *fruit* roundish and compressed, *with obtuse margins, scarcely keeled;* embryo circularly incurved above. — Ponds, local, N. S. to Fla., w. to the Pacific. Aug.–Oct. (Mex., W. I., Eurasia, n. Afr.)

13. **P. praelóngus** Wulf. *Stem white*, very long, branching, flexuous; *leaves* bright green, lance-oblong or lanceolate (0.5–3 dm. long), *half-clasping, obtuse with a boat-shaped cavity* at the extremity, thence splitting on pressure; stipules white, scarious, very obtuse, 1.5–8 cm. long; *peduncles very long* (sometimes reaching 5 dm.); spikes rather loose-flowered; *fruit* obliquely obovoid, compressed, *sharply keeled* when dry, 4–5 mm. long; style terminating the nearly straight face; curve of the embryo oval and longitudinal. — Ponds and lakes, N. S. to B. C., s. to Ct., N. J., the Great Lakes, Ia., Mont., and Cal. — Fruiting in June and July, withdrawing the stems to deep water to mature the fruit. (Eurasia.)

14. **P. Richardsònii** (Benn.) Rydb. Stem branching; *leaves long-lanceolate* from a *cordate-clasping base, acuminate, wavy, pale bright green*, 3–11 cm. long, 13–23-nerved; *stipules conspicuous*, at least as shreds; *peduncles* thickened upward, *of* somewhat *spongy texture*, elongating sometimes to 1 dm. or more; spikes 1.5–3.5 cm. long; fruit irregularly obovoid, distinctly beaked, obscurely 3-keeled, 4 mm. long, the *green epicarp puckered in drying*. (*P. perfoliatus*, var. *lanceolatus* Robbins.) — Quiet water, Que. to Mackenzie and B. C., s. to N. E., N. Y., the Great Lake region, Neb., etc. July–Sept.

15. **P. perfoliàtus** L. Similar; *leaves orbicular, ovate or lanceolate from a cordate-clasping base*, usually obtuse and crisped, 2–6 cm. long, 15–27-*nerved; stipules rarely developed, less than* 1 *cm. long; peduncles spongy and thickish,*

3-4 cm. long; *spikes 2–2.5 cm. long;* fruit similar. — Ponds and slow streams, local, N. E. to the Great Lakes. Sept., Oct. (Eu.)

16. **P. bupleuroides** Fernald. Very slender, branching; *leaves orbicular to lanceolate, obtuse, flat,* not crisped, drying blackish green or bronze, 1–3.5 cm. long, 7–17-*nerved;* stipules rarely developed, appressed and inconspicuous; *peduncles slender, scarcely spongy,* 2–6 cm. long; *spikes* 0.7–2 *cm. long;* fruit narrowly obovoid, 2.5–3.2 mm. long, the sides flat and deeply pitted, the back rounded, slightly 3-keeled; style slender and prominent; the olive or brownish *epicarp closely investing the seed.* (*P. perfoliatus* Man. ed. 6, in part, not L.) — Brackish, occasionally fresh, ponds and quiet streams, Nfd. and e. Que. to Fla., rarely inland to w. N. Y. and Mich. July–Sept.

× P. nitens Weber and plants closely simulating it in America are infertile and appear to be hybrids of no. 10 with no. 14, 15, or 16.

17. **P. mýsticus** Morong. *Stem very slender* and irregularly branching, nearly filiform; *leaves oblong-linear* (1.5–4 cm. long, 4–6 mm. wide), 5–7-nerved, *finely undulate and entire, obtuse or bluntly pointed, abruptly narrowing at base, sessile or partly clasping;* spikes few, capitate (4–6-flowered), on erect peduncles; fruit (immature) obovoid, small (less than 2 mm. long), *obscurely 3-keeled on the back,* a little beaked by the slender recurved style. — Locally in brackish ponds, Mass. and Md. — Infertile, and probably a hybrid of nos. 16 and 25.

18. **P. crispus** L. *Stem compressed; leaves linear-oblong,* sessile or half-clasping, obtuse, *serrulate, crisped-wavy,* 3–5-*nerved; fruit long-beaked;* upper portion of the embryo incurved in a large circle. — Fresh or brackish waters, Mass. to Ont. and Va. June, July. — Propagating chiefly by bur-like winter-buds formed by hardened abbreviated branches and indurated bases of leaves. (Nat. from Eu.)

19. **P. zosterifòlius** Schumacher. *Stem branching, wing-flattened; leaves* linear and grass-like (0.5–2 dm. long, 2–4 mm. wide), *abruptly pointed, with many fine and 3 larger nerves;* stipules oblong, very obtuse; *spikes cylindrical,* 12–15-flowered, *not half so long as the peduncle;* fruit obliquely obovoid, 3.5–4.5 mm. long, somewhat keeled and with slight teeth on the back, the sides not impressed, the face arching and terminated by the short style; *summit of the large embryo lying transverse to the fruit.* — Still and slow-flowing waters, N. B. to B. C., s. to N. J., the Great Lake region, Ia., etc. June–Aug. — Freely propagating by large winter-buds. (Eurasia.)

20. **P. acutifòlius** Link. Similar; *leaves many-nerved, sharp-acuminate; spikes globose,* 4-8-*flowered;* fruit conspicuously crested, the sides flat. — Collected at Lancaster, Pa., by *Muhlenberg* nearly a century ago; not since found in Am. July, Aug. (Eurasia, Austr.)

21. **P. Híllii** Morong. *Stem* slender, *widely branching, flattish; leaves* linear, *acute* (2.5–6.5 cm. long, 1–2.2 mm. wide), 3-*nerved,* the lateral nerves delicate and near the margin; stipules whitish, striate, obtuse; *spikes capitate* (3–6-fruited), *on short spreading or recurved peduncles;* fruit as in the last, but the sides rounded. — Lakes and ponds, Ct. to Pa., Mich., and Ont. July, Aug.

22. **P. obtusifòlius** Mertens & Koch. *Stem flattened, very branching; leaves* linear, tapering toward the base, obtuse and mucronate, 1.5–3.5 mm. broad, 3(*rarely 5 or 7*)-*nerved,* bearing 2 *large translucent glands* at base; *spike continuous,* 5–8-flowered (8–24-fruited, most of the carpels maturing), *about the length of the peduncle;* fruit ovoid, apiculate with the style, not keeled when fresh, *upper portion of embryo* coiled inward and *lying transverse to the fruit.* — Clear streams and ponds, e. Que. to Athabasca, s. to e. N. Y., Pa., Mich., Wisc., Minn., and Wyo. July–Sept. — Freely propagating by large winter-buds. (Eurasia.)

23. **P. Friêsii** Rupr. Resembling no. 25; *stem more flattened* and *less branching; leaves broader* (1–3 *mm. wide*), 5–7-*nerved;* winter-buds abundant; stipules conspicuous, white-hyaline; *glands small and dull;* spikes interrupted, in fruit 0.8–1.6 cm. long. (*P. mucronatus* Man. ed. 6, not Schrad.?) — Local, P. E. I. to B. C., s. to Ct., N. Y., Mich., Wisc., Minn., and N. Dak. July, Aug. (Eu.)

24. **P. strictifòlius** Benn. *Stems* slender, *wiry*, simple below, freely and *stiffly branched above*, the ascending branches mostly tipped by *large winter-buds; leaves* spreading-ascending, *very rigid*, 2–3.5 cm. long, 0.4–1 *mm. wide, revolute*, 3-nerved, the central nerve prominent; stipules as long as the upper internodes, appressed and veiny; peduncles rigid; spikes slightly interrupted, 6–10 mm. long, 3–8-fruited; fruit obliquely ellipsoidal, 2 mm. long, plump and rounded on the back, the style nearly in line with the straightish ventral face. (*P. pusillus*, var. *pseudo-rutilus* Benn.) — Que. to e. Mass., and Mich. July–Sept. — Perhaps a variety of no. 25.

25. **P. pusíllus** L. *Stem slender*, flattish or nearly cylindrical, often very branching; *leaves narrow-linear, acute or subacute*, 2–6 cm. long, 0.5–1.5 mm. wide, 3-*nerved*, furnished with *translucent glands* on each side at the base; winter-buds occasional; stipules at first obtuse, soon deciduous; spikes interrupted or capitate, 2–10-flowered, on rather long (0.5–3 cm.) peduncles; *fruit* obliquely ellipsoid, *scarcely keeled*, 1.5–2 mm. long; *apex of embryo* incurved and *directed obliquely downward.* — Pools, ditches, and ponds, generally distr. July–Sept. (Eurasia, Trop. Am.) Passing freely to the following varieties.

Var. **tenuíssimus** Mertens & Koch. *Leaves setaceous*, 0.2–0.5 *mm. wide*, 1–3-nerved. — Range of species.

Var. **polyphýllus** Morong. A dwarf bushy-branched sterile plant, bearing very abundant winter-buds. — Ponds, Me. and Mass.

Var. **capitàtus** Benn. Internodes very long, mostly much exceeding the leaves; peduncles elongate, mostly 3–6 cm. long. — P. E. I. and N. S. to Sask., B. C., and Ore.

Var. **Sturróckii** Benn. Leaves obtuse, pellucid and bright green, 0.8–2 mm. broad; fruit smaller than in the species. — Gaspé Co., Que., to Ct.

26. **P. lateràlis** Morong. Plants of two sorts, only the fruiting producing floating leaves; stem filiform, branching; *floating leaves elliptical* (0.8–1.2 cm. long, 2–4 mm. wide), with 5–7 nerves deeply impressed beneath, tapering into a somewhat dilated petiole; *submersed leaves linear*, acute (2.5–7 cm. long, 0.2–0.9 mm. wide), 1–3-nerved, the midnerve with fine veins or cellular reticulations on each side, bi-glandular at base; *stipules short*, deciduous; *peduncles widely spreading at maturity*, sometimes even recurved, often thicker than the stem; spikes often interrupted (2–4-flowered); fruit obliquely obovoid (hardly 2 mm. long), the back much curved, with two fine grooves upon it; embryo oval in its curve, the apex nearly touching the base. — Mass. and Ct. to Mich.; rare. July, Aug. — Undeveloped specimens resemble no. 25. Propagated by winter-buds on short lateral branches.

27. **P. Vasèyi** Robbins. Similar; very delicate; stem almost capillary; *floating leaves obovate* (0.7–1.4 cm. long, 3–6.5 mm. wide), the length of their filiform petioles, with 5–9 nerves deeply impressed beneath, cross-veins distinct: submersed leaves filiform-linear, very attenuate (2.5–5 cm. long, 0.1–0.5 mm. wide) and acute; *stipules* scarious, *long*, acute; spikes all emersed, few, interrupted-cylindric, 3–5-flowered, on a thickish peduncle; fruit oblique, round-obovoid, compressed, slightly sharp-margined, tipped with a distinct recurved style, the sides impressed and face acute; upper portion of the embryo circularly incurved, its apex transverse to the fruit. — Me. to Ont., s. to Ct., N. Y., O., Ill., and Minn., local. June–Aug. — The fruiting form, with floating leaves, rare; the submerged form, bearing winter-buds, apparently much more abundant.

28. **P. gemmíparus** Robbins. Stem filiform, branching, terete, varying greatly in height; *leaves hair-like*, sometimes not as broad as the stem, often with no apparent midrib, *tapering to the finest point* (1.5–8 cm. long), bi-glandular at base; *stipules* 1.2–2.5 cm. long, *obtuse, early deciduous; spikes* few (3–6-flowered), *interrupted*, on long filiform peduncles; *winter-buds very numerous; fruit* like that of *P. pusillus*, but *flattened and impressed on the sides*, very rare. — Slow-moving streams and still water, centr. Me. to R. I., local. Aug., Sept.

29. **P. rùtilus** Wolfgang. Stems very slender, simple or slightly branching at base; winter-buds usually wanting; *leaves erect, narrowly linear, attenuate,*

sharp-acuminate, soon revolute, 3–5-nerved, the *prominent midrib* often compound, bi-glandular at base; *stipules* 1–2 *cm. long*, *acuminate*, scarious and strongly nerved, *persistent;* peduncles 1.3–3.5 cm. long; spikes elongate, 6–8-flowered; fruit narrowly oblique-obovoid, about 2 mm. long, the erect style nearly in line with the straightish ventral face. — Gaspé Co., Que., to Hudson Bay, s. to Me., Vt., Mich., and Minn., local. (Eu.)

30. **P. foliòsus** Raf. *Stem filiform, flattish and very branching; leaves narrowly linear* (2–6 cm. long, 0.3–1 mm. wide), acute, *obscurely 3-nerved; stipules obtuse; spikes* capitate, 1–4(*usually* 2)-*flowered*, on short club-shaped peduncles; *fruit roundish-lenticular*, the *back* more or less *crested;* upper portion of the embryo incurved in a circle. (*P. pauciflorus* Pursh.) — Still waters, N. B. to B. C., and southw. July–Sept.

Var. **niagarénsis** (Tuckerm.) Morong. Stem often longer; leaves larger (4–9 cm. long, 1–2.4 mm. wide), 3–5-nerved at base, very acute and mucronate, narrowed to the subpetiolate base. — Running water, Me. to Ont., and southw.; also in Cal.

31. **P. confervoìdes** Reichenb. *Very slender and delicate* from a creeping rootstock, of a fine *light green;* stem filiform with several short and repeatedly dichotomous leaf-bearing branches; *leaves flaccid*, thin and flat, but *setaceous and tapering nearly to the fineness of a hair* (2.5–6.5 cm. long, 0.1–0.5 mm. wide), obscurely 1–3-nerved, with a few coarse reticulations; stipules rather persistent below, 5 mm. long, obtuse; *peduncle solitary, very long* (0.5–2 dm.), rather thickened upward; *spike* 4–8-*flowered, in fruit continuous, cylindrical; fruit thick-lenticular*, obscurely 3-keeled; *seed slightly impressed on the sides; epicarp thick and hard;* embryo nearly annular. (*P. Tuckermani* Robbins.) — Cold ponds, local, Me. to N. Y., N. J., and Pa. June–Aug.

32. **P. hýbridus** Michx. Floating leaves (when present) oval to lance-oblong (the largest 2.6 cm. long, 1.2 cm. wide), often acute, longer than the *filiform petioles*, with about 5–7 nerves beneath deeply impressed; submersed leaves very numerous, almost setaceous (2–7 cm. long, 0.1–0.5 mm. wide); stipules obtuse, adnate to the base of the lower leaves; emersed spikes 0.5–1.5 cm. long; *submersed* spikes 1–4-flowered, their *peduncles frequently recurved; fruit* about 1 mm. long, *about* 8-*toothed on the margin*, the lateral keels smooth; *embryo coiled* 1½ *turns.* (*P. diversifolius* Raf.) — Shallow quiet waters, Me. to Fla.; also Mich. to Mont. and Tex. July–Sept. (Mex., W. I.) Var. MULTI-DENTICULÀTUS (Morong) Asch. & Graebn. Fruit 12-toothed on the margin, the lateral keels 6–8-toothed. — Ct. to Fla. and La.

33. **P. dimórphus** Raf. Coarser; blades of the floating leaves with *rather dilated petioles*, with 5-many nerves beneath deeply impressed; upper submersed leaves either with or without a lance-oblong or broad-linear proper blade; the numerous lower ones narrow-linear, tapering toward the obtuse apex (2–4 cm. long, about 1 mm. wide); stipules early lacerate; *submersed flowers* 1–4, *on very short erect peduncles; fruit* with the back either *winged and with* 4–5 *distinct teeth or wingless and entire; embryo coiled* 1¾ *turns.* (*P. Spirillus* Tuckerm.) — N. B. to Ont., s. to Va., W. Va., and Mo. June–Sept.

34. **P. filifórmis** Pers. Stems from elongate tuberiferous rootstocks, filiform, branching at base, *low and very leafy; leaves pale, filiform, less than* 0.5 *mm. wide;* peduncles much elongated and overtopping the leaves (in one form shorter); spikes of 2–5 whorls, the *lowest whorls* 0.6–1.5 *cm. apart; fruit* 2.5–3 mm. long, globose-obovoid, *not keeled* upon the rounded back, tipped with the broad sessile stigma; *embryo annular.* (*P. marinus* auth., not L.?) — Shallow water in calcareous regions, e. Que. to Alb., s. to n. Me., n. Vt., w. N. Y., Mich., and the Rocky Mts. July–Sept. (Eurasia, Afr., Austr.)

35. **P. intèrior** Rydb. *Coarser;* the comparatively *stout stems flattened*, freely branching above, elongate; *leaves dark green, narrowly linear*, 0.5–2 *mm.* wide; peduncles of various lengths; spikes of 4–9 whorls, the *upper whorls crowded*, the *lowest* 4–9 *mm. apart; fruit compressed, narrowly oblique-obovoid, the ventral face straightish.* (*P. filiformis*, vars. *Macounii* and *occidentalis* Morong.) — Mostly in brackish water, P. E. I.; Huds. B. to Assina. and Athabasca, s. to Neb., Col., and Nev. July–Sept.

36. **P. pectinàtus** L. *Stem filiform*, repeatedly dichotomous, *leaves very narrowly linear or setaceous, attenuate to the apex*, 1-nerved with a few transverse veins; peduncles filiform; spikes of 2–6 remote whorls; *fruit* obliquely *broad-obovoid, compressed*, 3.5–4.5 *mm. long, rounded on the back*, obscurely ridged on the sides; *embryo spirally incurved.* — Chiefly in brakish water, e. Que. to B. C., s. along the coast to Fla., and in the interior to Pa., the Great Lake region, Kan., Col., etc. July–Sept. (Cosmop.)

37. **P. interrúptus** Kitaibel. Similar; *leaves usually broader* (0.5–2 *mm. wide*); edges of the stipules less scarious; *fruit* more compressed, *sharply keeled.* — Coast of e. N. B.; Mich.; probably of wide distrib. July–Sept. (Eu.)

38. **P. Robbínsii** Oakes. *Stem* ascending from a creeping base, *rigid*, very branching, *invested by the bases of the leaves and stipules; leaves crowded in two ranks, recurved-spreading*, narrow-lanceolate or linear, 7–12 cm. long, acuminate, *ciliate-serrulate* with translucent teeth, many-nerved; stipules obtuse when young, their nerves soon becoming bristles; *spikes numerous, loosely few-flowered*, on short peduncles; *fruit* oblong-obovoid, *keeled with a broadish wing*, acutely beaked; embryo stout, ovally annular. — In quiet water, N. B. to B. C., s. to Del., Pa., Ind., Wyo., Ida., and Ore.; rarely fruiting. July–Sept.

2. RÚPPIA L. Ditch Grass

Flowers 2 or more (approximate on a slender spadix, which is at first inclosed in the sheathing spathe-like base of a leaf), consisting of 2 sessile stamens, each with 2 large and separate anther-cells, and 4 small sessile ovaries, with solitary campylotropous suspended ovules; stigma sessile, depressed. Fruit small obliquely ovoid pointed drupes, each raised on a slender stalk which appears after flowering; the spadix itself also then raised on an elongated thread-form peduncle. Embryo ovoid, with a short and pointed plumule from the upper end, by the side of the short cotyledon. — Marine herbs, growing under water, with long and thread-like forking stems, and slender almost capillary alternate leaves sheathing at the base. Flowers rising to the surface at the time of expansion. (Dedicated to *H. B. Ruppius*, a German botanist of the 18th century.)

1. **R. marítima** L. Leaves linear-capillary; fruit obliquely erect; fruiting peduncles capillary (1–3 dm. long); stipes 0.5–4 cm. long. — Shallow bays and streams, along the entire coast; also occasionally in saline places in the interior. (Cosmop.)

3. ZANNICHÉLLIA [Mich.] L. Horned Pondweed

Flowers monoecious, sessile, naked, usually both kinds from the same axil; the sterile consisting of a single stamen, with a slender filament bearing a 2–4-celled anther; the fertile of 2–5 (usually 4) sessile pistils in the same cup-shaped involucre, forming obliquely oblong nutlets in fruit, beaked with a short style, which is tipped by an obliquely disk-shaped or somewhat 2-lobed stigma. Seed orthotropous, suspended, straight. Cotyledon taper, bent and coiled. — Slender branching herbs, growing under water, with mostly opposite long and linear thread-form entire leaves, and sheathing membranous stipules. (Named in honor of *G. G. Zannichelli*, a Venetian botanist.)

1. **Z. palústris** L. Style at least half as long as the fruit, which is flattish, somewhat incurved, even, or occasionally more or less toothed on the back (not wing-margined in our plant), nearly sessile; or, in var. pedunculàta J. Gay, both the cluster and the separate fruits evidently peduncled. — Ponds and slow streams, chiefly brackish, throughout N. A. July. (Cosmop.)

4. ZOSTÈRA L. Grass Wrack. Eel Grass

Flowers monoecious; the two kinds naked and sessile and alternately arranged in two rows on the midrib of one side of a linear leaf-like spadix, which is hidden in a long and sheath-like base of a leaf (spathe); the sterile flowers consisting of single ovate or oval 1-celled sessile anthers, as large as the ovaries,

and containing a tuft of threads in place of ordinary pollen; the fertile of single ovate-oblong ovaries attached near their apex, tapering upward into an awl-shaped style, and containing a pendulous orthotropous ovule; stigmas 2, long and bristle-form, deciduous. Utricle bursting irregularly, inclosing an oblong longitudinally ribbed seed (or nutlet). Embryo short and thick (proper cotyledon almost obsolete), with an open chink or cleft its whole length, from which protrudes a doubly curved slender plumule. — Grass-like marine herbs, growing wholly under water, from a jointed creeping stem or rootstock, sheathed by the bases of the very long and linear obtuse entire grass-like ribbon-shaped leaves (whence the name, from *ζωστήρ, a belt*).

1. **Z. marìna** L. Leaves obscurely 3–5-nerved. — Shoal water of bays along the coast, Nfd. to Fla.; Pacific coast. (Eurasia.)

5. NÀJAS L. Naiad

Flowers dioecious or monoecious, axillary, solitary, and sessile; the sterile consisting of a single stamen inclosed in a little membranous spathe; anther at first nearly sessile, the filament at length elongated. Fertile flowers consisting of a single ovary tapering into a short style; stigmas 2–4, awl-shaped; ovule erect, anatropous. Fruit a little seed-like nutlet, inclosed in a loose and separable membranous epicarp. Embryo straight, the radicular end downward. — Slender branching herbs, growing under water, with opposite and linear leaves, somewhat crowded into whorls, spinulose-toothed, sessile and dilated at base. Flowers very small, solitary, but often clustered with the branch-leaves in the axils; in summer. (*Ναϊάς, a water-nymph.*)

1. **N. marìna** L. *Stem rather stout and often armed with broad prickles; leaves broadly linear* (2 *mm. broad*), *coarsely and sharply toothed*, the dilated base entire; fruit 4–5 mm. long; *seed very finely lineate, oblong*, slightly compressed. — Marshes and salt springs of w. N. Y., Mich., and Minn.; Fla.; Utah to Mex. — Teeth of one or more brownish cells upon a many-celled base. (W. I., Eurasia, Austr.)

Var. **grácilis** Morong. Internodes long (5–8 cm.) and nearly naked, with only a few teeth above; leaves very narrow (0.5 mm. wide) with 8–12 teeth on each margin, the dilated base also toothed; fruit smaller. — Canoga marshes, w. N. Y.; Fla.

Var. **recurvàta** Dudley. Stems short, inclined to be dichotomously branched, recurved-spreading; leaves usually recurved, the teeth prominent, 2–7 on each margin, the dilated base with a projecting tooth each side. — N. Y.; Utah and Ariz.

2. **N. fléxilis** (Willd.) Rostk. & Schmidt. *Stems usually very slender; leaves very narrowly linear* (less than 1 mm. wide), *very minutely serrulate, tapering gradually to* the serrulate *base;* fruit 2.5–3 mm. long, narrowly oblong; *seeds lance-oval, smooth and shining.* — Ponds and slow streams, Lab. to B. C., s. to S. C. and Mo. — Teeth on the margins of the leaves 1-celled. (Eu.) Var. robústa Morong. Stem stout, few-leaved, sparsely branching, elongated; leaves flat, strongly ascending, linear-tapering. — Mass. to Mich. and Tex.

3. **N. guadalupénsis** (Spreng.) Morong. Similar; leaves with 20–45 very minute teeth on each margin; fruit 2 mm. long; *seeds dull*, conspicuously reticulate. (*N. microdon* A. Br.) — Pa. to Neb., and southw. (Trop. Am.)

4. **N. gracíllima** (A. Br.) Magnus. Branches alternate; *leaves* very narrowly linear, *nearly capillary*, straight, *serrate, the rounded lobes of the sheathing base spinulose-ciliate; fruit linear, impressed-dotted between the numerous ribs.* (*N. indica*, var. A. Br.) — Local, e. Mass. to e. N. Y., N. J., and Pa.; Mo. — Teeth of 3 cells each.

JUNCAGINÀCEAE (Arrow Grass Family)

Marsh plants, with terete bladeless leaves. Flowers perfect, spicate or racemose, with herbaceous 6(rarely 3)-lobed perianth. Carpels 3 or 6, more or less united, separating at maturity. Seeds anatropous; embryo straight. Fruit follicular or capsular.

1. **Scheuchzeria.** Ovaries 3, nearly distinct, at length divergent. Flowers bracteate, in a loose raceme upon a leafy stem.
2. **Triglochin.** Ovaries 3–6, united until maturity. Leaves radical. Flowers bractless, in a spike-like raceme terminating a jointless scape.

1. SCHEUCHZÈRIA L.

Sepals and petals oblong, spreading, nearly alike (greenish yellow), but the latter narrower, persistent. Stamens 6; anthers linear. Ovaries 3, globular, slightly united at base, 2–3-ovuled, bearing flat sessile stigmas, in fruit forming 3 diverging and inflated 1–2-seeded pods, opening along the inside. — A low bog-herb, with a creeping jointed rootstock, tapering into the ascending simple stem, which is zigzag, partly sheathed by the bases of the grass-like conduplicate leaves, and termimated by a loose raceme of a few flowers, with sheathing bracts; leaves tubular at the apex. (Named for *Johann* and *Johann Jacob Scheuchzer*, distinguished Swiss botanists early in the 18th century.)

1. **S. palústris** L. — Peat-bogs, and wet shores, e. Que. to N. J., westw. across the continent. June. (Eurasia.)

2. TRIGLÒCHIN L. Arrow Grass

Sepals and petals nearly alike (greenish), ovate, concave, deciduous. Stamens 3–6; anthers oval, on very short filaments. Pistils united into a 3–6-celled compound ovary; stigmas sessile; ovules solitary. Capsule splitting when ripe into 3–6 carpels, which separate from a persistent central axis. — Perennials, with rush-like fleshy leaves below sheathing the base of the wand-like naked and jointless scape. Flowers small, in a spiked raceme, bractless. (Name composed of τρεῖς, *three*, and γλωχίν, *point*, from the three points of the ripe fruit in no. 3 when dehiscent.)

Fruit thicker than long	1. *T. striata.*
Fruit longer than thick.	
Fruit (with 3–6 carpels) ovoid-prismatic, about twice as long as thick . .	2. *T. maritima.*
Fruit (3-carpelled) clavate- or linear-prismatic, 3–5 times as long as thick . .	3. *T. palustris.*

1. **T. striàta** R. & P. Scape (8–34 cm. high) and leaves slender; flowers very small; *sepals and stamens* 3; *fruit globose-triangular*, or when dry 3-lobed. (*T. triandra* Michx.) — Salt marshes, near seashore, Md. to Fla. and La. (S. A.)

2. **T. marítima** L. Scape (1.5–7.5 dm. high) and leaves thickish; *fruit ovoid or short-prismatic*, acutish; carpels 3– (more often) 6, rounded at base and slightly grooved on the back, the edges acutish. — Salt marshes near the coast, Lab. to N. J., and in saline, boggy, or wet places across the continent. (Eurasia., n. Afr.)

3. **T. palústris** L. Scape (5–50 cm. high) and leaves slender; *stamens* 6; *fruit linear-club-shaped; carpels* when ripe separating from below upward, leaving a triangular axis, *awl-pointed at base.* — Marshes (usually brackish) and bogs, Greenl. to the coast of s. Me.; also inland along the St. John and St. Lawrence R., Great Lakes and northwestw. (Eurasia.)

ALISMÀCEAE (Water-plantain Family)

Marsh herbs, with scape-like stems, sheathing leaves, and perfect, monoecious, or dioecious flowers; perianth of 3 *herbaceous persistent sepals and as many (often conspicuous) white deciduous petals, which are imbricate or involute in bud; stamens* 6 *or more, included; ovaries numerous, distinct,* 1-*celled and mostly* 1-*ovuled, becoming achenes in fruit* (in our genera); *seeds erect, campylotropous.* — Roots fibrous; leaves radical, petiolate and strongly nerved with transverse veinlets, the earlier sometimes without blade; flowers long-pedicellate,

mostly verticillate, in a loose raceme or panicle, with lanceolate scarious bracts slightly connate at base.

1. **Sagittaria.** Monoecious (or dioecious), lower (first developed) flowers pistillate, the upper (later) ones staminate. Stamens indefinite, mostly numerous. Carpels strongly flattened. In a dense head.
2. **Lophotocarpus.** Polygamous; lower flowers perfect, the upper staminate. Stamens 9–15. Carpels strongly flattened, in a dense head.
3. **Echinodorus.** Flowers all perfect. Stamens 6–21, mostly definite. Carpels somewhat turgid, in a dense head.
4. **Alisma.** Flowers all perfect. Stamens usually 6. Carpels strongly flattened, in a single ring.

1. SAGITTÀRIA L. Arrow-head

Sepals loosely spreading or reflexed in fruit. Petals imbricated in the bud. Ovaries crowded in a spherical or somewhat triangular depressed head on a globular receptacle, in fruit forming flat membranaceous winged achenes.—Marsh or aquatic, mostly perennial, stoloniferous herbs, with milky juice; the scapes sheathed at base by the bases of the long cellular petioles, of which the primary ones, and sometimes all, are destitute of any proper blade (*i.e.* are phyllodia); when present the blade is arrow-shaped or lanceolate. Flowers produced all summer, whorled in threes, with membranous bracts. (Name from *sagitta*, an arrow, from the prevalent form of the leaves.)

a. Beak of the achene erect or nearly so *b.*
 b. Beak long, usually half to three-fourths the length of the body.
  Leaves habitually sagittate, the basal lobes nearly or quite as long as the terminal portion of the blade.
   Stout; leaf-blades broadly ovate-oblong . . . . . 1. *S. longirostra.*
   Slender; leaf-blades linear . . . . . 3. *S. Engelmanniana.*
  Leaves lanceolate to elliptical, the basal lobes when present much shorter than the terminal portion . . . . . 8. *S. heterophylla.*
 b. Beak very short, not one-fourth the length of the body.
  Leaves all or most of them sagittate, ovate.
   Lowest bracts 0.5–1.5 cm. long; leaf-blades 2–18 cm. long . 4. *S. arifolia.*
   Lowest bracts 2–4 cm. long; leaf-blades 2.5–5 dm. long . . 5. *S. brevirostra.*
  Leaves never sagittate.
   Fruiting pedicels thickish, recurved . . . . . 11. *S. subulata.*
   Fruiting pedicels slender, ascending or spreading . . . . 10. *S. teres.*
a. Beak of the achene strongly incurved, almost or quite horizontal *c.*
 c. Leaves habitually sagittate, the basal lobes nearly or quite as long as the terminal portion . . . . . 2. *S. latifolia.*
 c. Leaves linear to elliptic-ovate, entire or rarely sagittate at the base, the basal lobes when present much shorter than the terminal portion of the blade.
  Fertile pedicels thickened, recurved; western . . . . . 12. *S. platyphylla.*
  Fertile pedicels slender, ascending or spreading.
   Filaments thickened at the base, short . . . . . 9. *S. graminea.*
   Filaments slender, longer than the anthers, pubescent . . 6. *S. lancifolia.*
   Filaments slender, longer than the anthers, glabrous . . 7. *S. ambigua.*

* *Filaments numerous, narrow, as long as or longer than the linear-oblong anthers; bracts 3, distinct; fruiting heads large.*

1. **S. longirostra** (M. Micheli) J. G. Sm. Robust, 3–6 dm. high, monoecious; leaves broadly ovate-oblong, obtusish, sagittate with broad basal lobes; fertile whorls 2–4; fertile pedicels about 1 cm. long; body of the mature *achene obovate*, winged all round, 3 mm. long, the *beak nearly erect* from the inner angle, 1.5–2 mm. *long.* — About springs, etc., Ct. (*Harger*), N. J., and Pa. to Ky., Del., and Ala. Fig. 33.

33. S. longirostra. Achene × 3.

2. **S. latifolia** Willd. Glabrous; scape 1–9 dm. high, angled, with one or more of the lower whorls fertile; leaves ovate, acute, almost always sagittate, the basal lobes triangular, acute; pedicels of the fertile flowers at least half the length of the sterile ones; petals wholly white; filaments glabrous, nearly twice the length of the anthers; achenes obovate (about 2 mm. long),

winged on both margins, with a *curved usually horizontal beak.* (*S. variabilis* Engelm.) — In water or wet places, very common; exceedingly variable as to leaf-contour. Fig. 34. The following forms, although ill defined, are in most instances recognizable: Forma OBTÙSA (Muhl.) Robinson. (*S. obtusa* Muhl.) Leaves very broad, sagittate, obtuse. Forma HASTÀTA (Pursh) Robinson. (*S. hastata* Pursh.) Leaf-blades and their basal lobes oblong-lanceolate, acute. Forma GRÁCILIS (Pursh) Robinson. (*S. gracilis* Pursh.) Leaf-blades and their basal lobes narrowly linear. Forma DIVERSIFÒLIA (Engelm.) Robinson. (*S. variabilis*, var. Engelm.) Leaf-blades partly sagittate and partly lanceolate or elliptic without basal lobes.

34. S. latifolia. Achene × 3.

Var. **pubéscens** (Muhl.) J. G. Sm. Robust, *pubescent*, broad-leaved; *bracts* shorter than in the other forms, 6–9 mm. long, broadly ovate, obtusish, and *very pubescent.* — N. J. and Pa. to N. C.

3. **S. Engelmanniàna** J. G. Sm. *Slender; lobes* of the sagittate leaves *very narrowly linear* (1–3 mm. wide); achene narrowly cuneate-obovate (4 mm. long), the *beak elongated, erect or recurved*, the sides usually strongly 1–3-crested. (*S. variabilis*, var. *gracilis* Engelm.) — About ponds, etc., "N. H." and Mass. to Del. Fig. 35.

35. S. Engelmanniana. Achene × 3.

4. **S. arifòlia** Nutt. Monoecious, glabrous; scape 2–4 dm. high, simple or rarely branched; fertile whorls 1–(rarely)3; fertile pedicels 3–11 mm. long; leaf-blades sagittate-hastate, ovate, acute; *achenes* winged all round, *bearing* at the upper inner angle a *minute erect beak.* — Que. to centr. Me., Vt., Ct., Mich., Kan., Dak., and westw. — When in deep water producing lance-linear phyllodia at the base and developing elongated petioles of the blade-bearing leaves (*S. cuneata* Sheldon). Fig. 36.

36. S. arifolia. Achene × 3.

5. **S. breviróstra** Mackenzie & Bush. Very stout; scape 6–12 dm. high; leaf-blades all sagittate, basal lobes ovate-lanceolate, acute, about as long as the terminal portion; *inflorescence* simple or slightly branched, 2–5 *dm. long;* bracts lanceolate, attenuate; fruiting pedicels 1–2 cm. long; *fruiting heads* 2–3 *cm. in diameter;* achenes cuneate-obovate, with dorsal wing prominent; *beak suberect, but little surpassing the wing at the summit.* — Sloughs and bottoms, Ind. to Kan.

6. **S. lancifòlia** L. Scape 8–15 dm. high, with several of the lower whorls fertile; *leaves lanceolate or lance-oblong, rarely linear, all with a tapering base*, thick or coriaceous (1.5–4.5 dm. long on a long and stout petiole, never sagittate), the nerves mostly arising from the very thick midrib; bracts ovate, acute or acuminate; pedicels slender, the fertile scarcely shorter than the sterile ones; *filaments pubescent; achenes falcate*, winged on the back, *pointed with an incurved beak.* — Swamps, Md. to Ky., Mo., and southw. (W. I.) Fig. 37.

37. S. lancifolia. Achene × 3.

7. **S. ambígua** J. G. Sm. Scape 4–6 dm. high; leaves as in the preceding; raceme simple; pedicels 1.5–2.5 cm. long; bracts lanceolate, small (8 mm. long); *filaments glabrous; achenes with a short incurved beak*, scarcely winged. — Borders of ponds, etc., Kan. and southw.

** *Filaments very short, with enlarged mostly glandular base; anthers ovate or short-oblong; fruiting heads small; bracts more or less connate; leaves very rarely sagittate.*

38. S. heterophylla. Achene × 3.

8. **S. heterophýlla** Pursh. Scape weak (1.5–8 dm. high), at length procumbent; leaves lanceolate or lance-oval, entire, or with one or two narrow basal sagittate appendages; *bracts roundish, obtuse;* flowers of the lowest whorl fertile and *almost sessile;* the sterile on long pedicels; filaments glandular-pubescent; *achenes narrowly obovate with a long erect beak.* — N. E. to Fla., w. to Minn. and Mo. — Varies as to foliage, the

leaves being broad (var. ELLÍPTICA Engelm.), or rigid, narrowly lanceolate and acute, unappendaged at the base, and with stout petioles (var. RÍGIDA (Pursh) Engelm.), or nearly linear (var. ANGUSTIFÒLIA Engelm.). FIG. 38.

9. S. gramínea Michx. Scape 0.8–5 dm. high; *phyllodia flat*, mostly *broad-linear, acuminate;* leaves ovate-lanceolate to linear, on long slender petioles, sometimes reduced to the petiole merely; bracts rather obtuse; whorls of flowers often few, all staminate or the lower fertile; *pedicels* slender, *spreading*, nearly equal; flowers white or roseate; *filaments* 10–13 "–20," glandular-pubescent; achene small (1 mm. long), narrowly obovate, almost beakless, *winged on the back, flat and scarcely costate* on the sides. (*S. Eatoni* J. G. Sm.) — Nfd. to Ont., s. to the Gulf; very variable. FIG. 39. S. CRISTÀTA Engelm. is apparently a form of this species with achenes somewhat wing-crested.

39. S. graminea. Achene × 3.

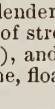
10. S. tères Wats. *Phyllodia terete, very acutely attenuate* upward, 9–34 cm. long, very rarely bearing a narrow blade; scape 1–5 dm. high; bracts connate at base; *pedicels* in 1–3 whorls, all very *slender and spreading*, 1 or 2 fruiting, 1–3 cm. long; filaments 12, dilated, pubescent; *achene* obovate, 2–2.4 mm. *long, with an erect beak*, the margins and sides *crenately several-crested.* (*S. isoëtiformis* J. G. Sm.) — In shallow water, Cape Cod, Mass., and L. I. to Fla. — Phyllodia usually very strongly nodose. FIG. 40.

40. S. teres. Achene × 3.

11. S. subulàta (L.) Buchenau. Usually dwarf; *leaves linear, strap-shaped, obtuse or acutish*, 3–20 cm. long, equaling or shorter than the scape, very rarely with a narrow blade; pedicels in 1–3 whorls, only 1 or 2 fruiting, *stouter and recurved;* bracts connate or spathe-like; *filaments* 6–8, *glabrous; achene* obovate, *short-beaked. 2 mm. long*, the margins and sides *crenately crested.* (*S. natans*, var. *lorata* Chapm.; *S. pusilla* Nutt.) — In mud or shallow water, near the coast; Ct. to Fla. — In the South often becoming more robust.

Var. (?) gracíllima (Wats.) J. G. Sm. Scape and the almost or wholly bladeless *leaves very slender and greatly elongated* (6–12 dm. long, 2 mm. wide); pedicels all elongated, in usually distant whorls, the lower pistillate, slender and spreading; fruit unknown. (*S. natans*, var. Wats.) — In deep water of streams in e. Mass. (*Hitchings, Boott, C. E. Faxon*, etc.), R. I. (*J. F. Collins*), and Ct. (*Bissell*). — Wholly submerged, only 1 or 2 flowers appearing at a time, floating on the surface. The fruit has not yet been collected.

12. S. platyphýlla (Engelm.) J. G. Sm. Scape 2–5 dm. high; *leaves elliptic-lanceolate*, acute at both ends, rarely biauriculate at the base, 9–11-nerved; fertile whorls usually 2; fertile pedicels about 2 cm. long, soon recurved; *stamens about* 20, *the broad base of the filament pubescent.* (*S. graminea*, var. Engelm.) — River sloughs, s. Mo. and Kan. to Tex. FIG. 41.



41. S. platyphylla. Achene × 3.

2. LOPHOTOCÁRPUS Th. Durand

Sepals strongly concave, erect and appressed to the fruit. — Perennials with habit and carpels much as in *Sagittaria*. (Name from λόφος, *a crest*, and καρπός, *fruit*, not very applicable.) LOPHIOCARPUS (Kunth) Miquel, not Turcz.

* *Chiefly maritime; leaves mostly thick spongy phyllodia, the blades when present small, lance-oblong, entire, or ovate and sagittate, the auricles relatively small, linear-oblong, divergent.*

1. L. spongiòsus (Engelm.) J. G. Sm. Low (1–3 dm. high); leaf-blades 0.5–2.5 cm. broad; the thick spongy petioles septate-nodulose; scapes 4–15 cm. high, recurved, bearing mostly 2 whorls of flowers; head of carpels 7–10 mm. in diameter. (*L. spatulatus* J. G. Sm.; *Sagittaria calycina*, var. Engelm.) — On tidal mud of brackish estuaries, etc., N. B. (*Fowler*) to Del.; rarely inland, Mo. (*L. depauperatus* J. G. Sm., at least in part).

** *Species of the interior; leaf-blades relatively large, sagittate with broad triangular auricles.*

2. **L. calycìnus** (Engelm.) J. G. Sm. Taller (1.5–4 dm. high); leaf-blades deeply sagittate, thin, 10–15-nerved, 4–8 cm. broad, the auricles triangular, acute, nearly or quite as long as the terminal portion of the blade; stipes recurving or procumbent, 1–4 dm. long, usually bearing 3–4 whorls of flowers; head of carpels about 1 cm. in diameter. (*Sagittaria* Engelm.) — Muddy banks, Mich. to Dak. and southw.

Var. **máximus** (Engelm.) Robinson. Leaf-blades very large (3 dm. wide), 18–21-nerved, considerably broader than long, the auricles almost divaricate; inflorescence stout, sometimes branched. (*Sagittaria calycina*, var. Engelm.) — O. (*Moseley*) and southw.

3. ECHINÓDORUS Richard.

Petals imbricated in the bud. Stamens 6–21 or more. — Mostly annuals, with the habit of *Sagittaria*, the naked stems sparingly branched or simple, and the flowers on rather short pedicels, in whorls of 3–6 or more. Fl. summer and autumn. (Name from ἐχινώδης, *prickly*, or from ἐχῖνος, and δορός, *a leathern bottle*, applied to the ovary, which is in most species armed with the persistent style, so as to form a sort of prickly head of fruit.)

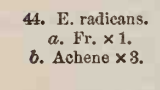
a *b* *c*

42. E. tenellus. *a*. Fl. × 1. *b*. Fr. × 1. *c*. Achene 3.

1. **E. tenéllus** (Martius) Buchenau. *Scapes* 1.5–10 *cm. high;* shoots often creeping and proliferous; submersed leaves lance-linear phyllodia, emersed *leaves* petiolate with a *lanceolate blade, acute* (1–3 cm. long); umbel single, 2–8-flowered; pedicels reflexed in fruit; flower 6 mm. broad; stamens 9; styles much shorter than the ovary; achenes beakless, 8-ribbed, reddish brown, without glands. (*Alisma* Martius; *Helianthium* Britton; *E. parvulus* Engelm.) — Submersed or on mud, e. Mass., Mich., Minn., and southw. (S. A.) Fig. 42.

43 E. cordifolius. Achene × 3.

2. **E. cordifòlius** (L.) Griseb. *Scape erect, 1–6 dm high,* longer than the leaves; *leaves broadly ovate, cordate or truncate at base, obtuse* (the blade 2–11 cm. long); umbel proliferous, in a branched panicle; flower 8–10 mm. broad; *stamens* 12; *styles longer than the ovary; achenes with a conspicuous erect beak.* (*E. rostratus* Engelm.) — Borders of ponds and ditches, Ill. to Kan., s. Cal., and Fla. Fig. 43. Var. LANCEOLÀTUS (Engelm.) Mackenzie & Bush is a low form which has the leaves lanceolate with an acute base. — Ill., Mo.



a *b*

44. E. radicans. *a*. Fr. × 1. *b*. Achene × 3.

3. **E. radicans** (Nutt.) Engelm. *Stems or scape prostrate, creeping* (6–12 dm. long), proliferous, bearing many whorls of flowers; leaves somewhat truncately heart-shaped, obtuse (5–20 cm. broad), long-petioled; flowers 12–20 mm. broad; *stamens about* 21; *styles shorter than the ovary; achenes* with a short incurved beak, the keeled back denticulate. — About ponds, etc., Ill. to N. C. and Fla., w. to Kan. and Tex. Fig. 44.

4. ALÍSMA L. Water Plantain

Petals involute in the bud. Ovaries many in a simple circle on a flattened receptacle, forming flattened coriaceous achenes, which are dilated and 2–3-keeled on the back. — Scape with whorled panicled branches. Flowers small, white or pale rose-color. (The Greek name; of uncertain derivation.)

1. **A. Plantàgo-aquática** L. Perennial by a stout proliferous corm; leaves long-petioled, ovate or oblong, acute, mostly rounded or heart-shaped at base, 3–9-nerved; scapes 1 or 2; *panicle* loose, pyramidal, 3–6 dm. long, *much overtop-*

ping the leaves, with verticils of 2 or 3 orders; *rays and slender pedicels ascending* at an angle of about 45°; sepals 10-striate, the hyaline margins whitish; petals 2–4 mm. long, white, with yellowish claw; stamens twice as long as the carpels; *these furrowed along the back*, not meeting at the center of the disk.—Shallow water and ditches, across the continent. (Eurasia.) FIG. 45.

45. A. Plant.-aq. Fruit × 1.

2. A. Geyèri Torr. Scapes 2–4, the shorter overtopped by the long-petioled linear-lanceolate to elliptic leaves; panicles usually less diffuse, the verticils in 1 or 2 orders; *the thickish peticels strongly divergent in fruit;* sepals 10–14-striate, the margins rose-color; petals 1–2 mm. long, rose-color, with yellow basal spot; stamens about equaling the carpels; *these ridged on the back*, meeting at the center of the disk.—Locally from N. Y. to N. Dak. and the Pacific. (Eurasia.)

HYDROCHARITÀCEAE (FROG'S BIT FAMILY)

Aquatic herbs, with dioecious or polygamous regular flowers, sessile or on scape-like peduncles from a spathe, and simple or double floral envelopes, which in the fertile flowers are united into a tube and coherent with the 1–3-celled ovary. Stamens 3–12, distinct or monadelphous; anthers 2-celled. Stigmas 3 or 6. Fruit ripening under water, indehiscent, many-seeded.

1. **Elodea.** Stem elongated, submerged, leafy. Spathes small, sessile.
2. **Vallisneria.** Stemless. Leaves narrow, elongated. Spathes pedunculate.
3. **Limnobium.** Stem very short. Leaves crowded; blades broad and spongy. Spathes pedunculate.

1. ELODÈA Michx. WATER-WEED

Flowers polygamo-dioecious, solitary and sessile from a sessile tubular 2-cleft axillary spathe. Sterile flowers small or minute, with 3 sepals barely united at base, and usually 3 similar or narrower petals; filaments short and united at base, or none; anthers 3–9, oval. Fertile flowers pistillate or apparently perfect; limb of the perianth 6-parted; the small lobes obovate, spreading. Ovary 1-celled, with 3 parietal placentae, each bearing a few orthotropous ovules; the capillary style coherent with the tube of the perianth; stigmas 3, large, 2-lobed or notched, exserted. Fruit oblong, coriaceous, few-seeded.—Perennial slender herbs, with pellucid veinless 1-nerved sessile whorled or opposite leaves. The staminate flowers (rarely seen) commonly break off and float on the surface, where they expand and shed their pollen around the stigmas of the fertile flowers, raised to the surface by the prolonged calyx-tube. (Name from ἑλώδης, *marshy*.)

1. E. canadénsis Michx. Leaves varying from linear to oval-oblong, minutely serrulate; stamens 9 in the sterile flowers, 3 or 6 almost sessile anthers in the fertile. (*Anacharis* Planch.; *Philotria* Britton.)—Slow streams and ponds, common. July. (Nat. in Eu.)

2. VALLISNÈRIA [Mich.] L. TAPE GRASS. EEL GRASS

Flowers dioecious; the sterile crowded in a head, inclosed in an ovate at length 3-valved spathe borne on a short scape; stamens mostly 3. Fertile flowers solitary and sessile in a tubular spathe on an exceedingly lengthened scape. Calyx 3-parted in the sterile flowers; in the fertile with a linear tube coherent with the 1-celled ovary, but not extended beyond it, 3-lobed (the lobes obovate). Petals 3, linear, small. Stigmas 3, large, nearly sessile, 2-lobed. Ovules very numerous, scattered over the walls, orthotropous. Fruit elongated, cylindrical, berry-like.—Long linear leaves wholly submerged or their ends floating. The staminate flower-buds themselves break from their short pedicels and float on the surface, were they shed their pollen around the fertile flowers,

which are raised to the surface by sudden growth at the same time; afterwards the thread-form scapes (6–12 dm. long) coil up spirally, drawing the fruit under water to ripen. (Named for *Antonio Vallisneri*, an early Italian botanist.)

1. **V. spiràlis** L. Leaves thin, ribbon-like (0.3–2 m. long), obscurely serrulate, obtuse, somewhat nerved and netted-veined. — Common in slow waters, N. S. to Fla., w. to Minn. and Tex. (Eurasia, Austr.)

3. LIMNÒBIUM Richard. American Frog's Bit

Flowers dioecious (or monoecious?), from sessile or somewhat peduncled spathes; the sterile spathe 1-leaved, producing about 3 long-pediceled flowers; the fertile 2-leaved, with a single short-pediceled flower. Calyx 3-parted or cleft; sepals oblong-oval. Petals 3, oblong-linear. Filaments in the sterile flowers entirely united in a central solid column, bearing 6–12 linear anthers at unequal heights; stamens in the fertile flowers 3–6 awl-shaped rudiments. Ovary 6–9-celled, with as many placentae in the axis, forming an ovoid many-seeded berry in fruit; stigmas as many as the cells, but 2-parted, awl-shaped. — Floating in stagnant water and proliferous by runners. Leaves round-heart-shaped, spongy-reticulated and purplish underneath. (Name from λιμνόβιος, *living in pools.*)

1. **L. Spóngia** (Bosc) Richard. Leaves 2.5–5 cm. long, faintly 5-nerved; peduncle of the sterile flower about 7.5 cm. long and filiform, of the fertile only 2.5 cm. long and stout. — Stagnant water, N. J. to Fla.; also L. Ont. to Ill., Mo., and Tex.

GRAMÍNEAE (Grass Family)

(Revised by A. S. Hitchcock)

Herbs (shrubs or trees in Bambuseae) with usually hollow stems (culms) *closed at the nodes, and 2-ranked parallel-veined leaves these consisting of two parts, the sheath and the blade, the sheath enveloping the culm with the margins overlapping or rarely grown together; at the junction of the sheath and blade, on the inside, is a membranaceous hyaline or hairy appendage* (the ligule) *rarely obsolete.* Flowers perfect (rarely unisexual), very small, without a distinct perianth, arranged in spikelets consisting of a shortened axis (*rhachilla*) and 2–many distichous bracts, the lowest two of which (the *glumes*) are empty (rarely 1 or both obsolete); in the axil of each succeeding bract (the *lemma*) is borne a single flower, subtended and usually enveloped by a (normally) 2-nerved bract or prophyllum (the *palea*), with its back to the rhachilla; at the base of the flower, between it and the lemma, are usually 2 very small hyaline scales (the *lodicules*), rarely a third lodicule between the flower and the palea; stamens 3 (rarely 1, 2, or 6), with very delicate filaments and 2-celled versatile anthers; pistil, one, with a 1-celled 1-ovuled ovary, 2 (rarely 1 or 3) styles, and mostly plumose stigmas. Fruit a caryopsis with starchy endosperm and a small embryo at the base on the side opposite the hilum. Grain usually inclosed at maturity in the lemma and palea, free or adnate to the palea. The lemma with its palea and flower constitute the *floret.* The lemma may be variously modified; and may be sterile or neuter, that is, containing a palea or rudiment of one, without a flower, or empty; or may itself be rudimentary (as in some of the *Chlorideae*); in such cases the spikelet contains at least one perfect floret; the sterile or modified lemmas, one or more, above or below it. The palea is rarely obsolete. Spikelets arranged in spikes, racemes, or panicles, the branches of which are bractless.

Subfamily I. PANICOÍDEAE

Spikelets 1-, rarely 2-flowered, when 2-flowered the terminal flower perfect, the lower staminate or neuter; rhachilla articulated below the glumes, the more or less dorsally compressed spikelets falling from the pedicels entire, singly, in groups, or together with joints of an articulate rhachis.

This first grand division of the *Gramineae* is based upon two characters in combination, the articulation of the pedicels just *below* the spikelets or cluster of spikelets and the *single perfect flower*, which may or may not have a staminate or imperfect flower *below* it. The lemma of the imperfect flower is similar to the glumes in texture in *Paniceae* and like the fertile lemma in the other tribes. In a few genera the first glume is obsolete, but in these cases the articulation *below* the *dorsally compressed* spikelets indicates their relation.

Tribe I. MAÝDEAE. Pistillate and staminate spikelets in different inflorescences or in different parts of the same inflorescence; awnless; glumes indurated.

1. **Tripsacum.** Staminate spikelets above the pistillate, in pairs at each joint of a spike-like raceme; pistillate single, imbedded in the jointed rhachis.

Tribe II. ANDROPOGÒNEAE. Spikelets in pairs or threes on the usually articulate rhachis of a spike-like raceme, one sessile and fertile, the other pediceled and perfect, staminate, neuter or rudimentary; glumes more or less indurated; lemmas smaller and hyaline, that of the fertile flower usually awned.

2. **Rotthoellia.** Rhachis naked; pediceled spikelets neuter, often rudimentary; fertile spikelets awnless.
3. **Erianthus.** Rhachis hairy; spikelets all perfect and fertile, awned.
4. **Andropogon.** Rhachis hairy; pediceled spikelets sterile, often rudimentary; fertile spikelets awned.
5. **Sorghastrum.** Racemes reduced to one or two joints, on slender peduncles, arranged in open panicles; second spikelet reduced to a pedicel.

Tribe III. PANÍCEAE. Spikelets all perfect (in our genera) in racemes or panicles; glumes membranaceous, unequal, the first usually small, sometimes obsolete; a lemma of like texture, empty or with a hyaline palea, rarely inclosing a staminate flower, subtends the perfect floret and simulates a third glume; fertile lemma and palea indurated, firmly clasped together, inclosing the free grain, awnless (pointed in *Echinochloa*).

* Spikelets without an involucre of bristles.

+ Lemma leathery-indurated with hyaline margins not inrolled; spikelets lanceolate; first glume sometimes wanting.

6. **Digitaria.** Spikelets in slender spike-like racemes, aggregated toward the summit of the culm.
7. **Leptoloma.** Spikelets long-pediceled in a diffuse panicle.

++ Lemma chartaceous-indurated; margins not hyaline, inrolled except in *Amphicarpon*.

++ Glumes and lemmas awnless.

8. **Amphicarpon.** Spikelets of 2 kinds, one in terminal panicle, not fruitful; the other subterranean, perfecting fruit; margins of lemma not inrolled.
9. **Paspalum.** Spikelets all alike, plano-convex, sessile or nearly so, solitary or in pairs in 2 rows on one side of a flattened rhachis; first glume obsolete (rarely present); spikelets placed with back of fertile lemma toward the rhachis.
10. **Axonopus.** Spikelets all alike, compressed, biconvex, sessile, solitary in 2 rows on one side of a flattened rhachis; first glume obsolete; spikelets placed with the back of the fertile lemma from the rhachis.
11. **Panicum.** Spikelets all alike, biconvex, in panicles (rarely racemes); first glume present; second glume and sterile lemma similar.
12. **Sacciolepis.** Spikelets all alike, in spike-like panicles; second glume saccate at base, 11-nerved; sterile lemma flat, 3–5-nerved.

++ ++ Sterile lemma awned or pointed; fruit acuminate; palea not included at the summit.

13. **Echinochloa.** Spikelets crowded in one-sided racemes, these arranged in a panicle.

* * Spikelets with an involucre of bristles.

14. **Setaria.** Spikelets in a dense cylindrical spike-like panicle; bristles persistent.
15. **Cenchrus.** Spikelets (1–5 together) inclosed in a globular spiny bur-like involucre; this falling with spikelets inclosed.

SUBFAMILY II. POACOÍDEAE

Spikelets 1–many-flowered, the imperfect or rudimentary floret, if any, usually uppermost, *rhachilla usually articulated above the glumes which are persistent on the pedicel or rhachis after the fall of the florets;* when 2–many-flowered a manifest internode of the rhachilla separates the florets, and is articulated below them; *spikelets* more or less *laterally compressed* (except in *Milium*). The spikelets are articulated below the glumes in *Oryzeae*, *Alopecurus*, *Cinna*, *Polypogon*, *Holcus*, *Sphenopholis*, *Spartina*, and *Beckmannia;* these are distinguished from SUBFAMILY I by the *laterally compressed spikelets.*

Tribe IV. ORŸZEAE. Spikelets unisexual or perfect, in loose panicles; rhachilla articulated below the glumes; glumes often wanting; stamens often 6.

16. **Zizania.** Spikelets unisexual, unlike in appearance; panicle pistillate above, staminate below.
17. **Zizaniopsis.** Spikelets unisexual, much alike in appearance, intermixed in the same panicle.
18. **Leersia.** Flowers perfect, spikelets much flattened laterally; lemma carinate, awnless; palea 1-keeled.

Tribe V. PHALARÍDEAE. Spikelets laterally compressed, 1(rarely 3)-flowered; two sterile lemmas below the fertile floret, and falling attached to it, usually empty and unlike the fertile lemma, sometimes reduced to bristles, or sometimes with a staminate flower in *Hierochloë;* fertile lemma with a 1–2-nerved or nerveless palea and a perfect flower.

19. **Phalaris.** Sterile lemmas very narrow, much shorter than the indurated fertile lemma, which is much exceeded by the equal glumes.
20. **Anthoxanthum.** Sterile lemmas dorsally awned, larger than the slightly indurated fertile lemma; glumes very unequal.
21. **Hierochloë.** Sterile lemmas larger than the fertile lemma, indurated, inclosing a 2-nerved palea and usually a staminate flower; glumes subequal, scarcely exceeding the florets.

Tribe VI. AGROSTÍDEAE. Spikelets 1-flowered; rhachilla sometimes prolonged behind the palea into a naked or plumose bristle; glumes subequal, usually equaling or exceeding the lemma; palea 2-nerved, rarely nerveless or wanting (1-nerved in one species of *Cinna*).

* Lemma indurated.

+ Spikelets awnless; callus none; margins of lemma inrolled.

22. **Milium.** Spikelets dorsally compressed.

+ + Spikelets with a terminal awn; margins of lemma not inrolled; a callus at base. — STIPÈNAE.

23. **Oryzopsis.** Awn simple, deciduous; callus short, obtuse.
24. **Stipa.** Awn simple, persistent; callus usually acute.
25. **Aristida.** Awn 3-fid, the branches divaricate; callus acute.

* * Lemma membranaceous.

+ Lemma awned from the tip or mucronate, closely infolding the grain; callus acute.

26. **Muhlenbergia.** Rhachilla not prolonged behind the palea; lemma pointed or awned.
27. **Brachyelytrum.** Rhachilla prolonged into a bristle behind the palea, lemma long-awned.

+ + Lemma awnless or dorsally awned, loosely embracing the grain.

++ Glumes conspicuously compressed-carinate; spikelets in dense spike-like panicles. — PHLEÈNAE.

28. **Heleochloë.** Lemma membranaceous like the glumes, awnless; glumes not aristate; panicle partly included, ovoid.

29. **Phleum.** Lemma hyaline, awnless, glumes abruptly aristate; panicle exserted, cylindrical.
30. **Alopecurus.** Lemma hyaline, awned below the middle; palea none; glumes not aristate; panicle exserted, cylindrical.

++ ++ Glumes not conspicuously compressed; spikelets in open or narrow panicles. — AGROSTÌNAE.

= Lemma 1 (rarely 3) -nerved, awnless; pericarp readily separating from the grain.

31. **Sporobolus.** Lemma as long as or longer than the glumes; culms wiry or rigid.

= = Lemma 3–5-nerved, awned or awnless; pericarp adherent to the grain.

a. Floret not stipitate; palea 2-nerved; stamens 3.

b. Rhachilla not prolonged behind the palea.

32. **Agrostis.** Glumes longer than the floret, awnless; panicle usually open.
33. **Polypogon.** Glumes longer than the floret, awned; panicle spike-like.
34. **Calamovilfa.** Glumes shorter than the floret, awnless.

b b. Rhachilla prolonged behind the palea, bristle-like.

35. **Calamagrostis.** Perennial; panicle loose or contracted; prolonged rhachilla and callus with long hairs; lemma short-awned below the middle.
36. **Ammophila.** Perennial; panicle dense and spike-like; prolonged rhachilla and callus with short hairs; lemma awnless.
37. **Apera.** Annual; panicle loose; the prolonged rhachilla naked; lemma long-awned below the bifid apex.

a a. Floret stipitate; palea 1–2-nerved; stamen 1.

38. **Cinna.** Spikelets in a loose panicle.

Tribe VII. **AVÈNEAE.** Spikelets 2–several-flowered, panicled; rhachilla prolonged behind the palea of uppermost floret except in *Aira;* glumes usually longer than the first floret; 1 or more of the florets awned on the back or from the teeth of the bifid apex (or usually awnless in *Sphenopholis* and *Koeleria*); the callus and usually the rhachilla-joints hairy.

* Rhachilla not prolonged behind the palea of uppermost floret; spikelets 2-flowered, both perfect

39. **Aira.** Florets approximate; glumes broad, boat-shaped.

* * Rhachilla prolonged behind the palea of uppermost floret; spikelets 2–several-flowered.

+ Articulation below the glumes; spikelets falling entire or the glumes and lowest floret together

++ Glumes much exceeding the two florets.

40. **Holcus.** Lower floret stipitate, awnless, upper with a hook-like awn.

++ ++ Glumes exceeded by upper floret.

41. **Sphenopholis.** Glumes dissimilar, the second obovate; florets usually awnless.

+ + Articulation above the glumes.

++ Awns wanting or but a mucronate tip.

42. **Koeleria.** Glumes unequal, exceeded by the upper floret.

++ ++ Awns present.

= Awns dorsal, not flattened.

a. Spikelets 2–several-flowered; florets all perfect or the uppermost imperfe

b. Spikelets less than 1 cm. long; grain free.

43. **Trisetum.** Lemma keeled, bidentate, awn arising from above the middle.
44. **Deschampsia.** Lemma convex, awn from the middle or below.

b b. Spikelets more than 1 cm. long; grain adherent to the palea.

45. **Avena.** Florets approximate, exceeded by the striate glumes.

a a. Spikelets 2-flowered; lower floret staminate, upper perfect.

46. **Arrhenatherum.** Lower floret long-awned, upper usually awnless.

= = Awns from between the teeth of the bidentate apex of the lemma, flattened, twisted.

47. **Danthonia.** Florets several, not closely approximate, glumes equaling or exceeding the uppermost.

Tribe VIII. CHLORÍDEAE. Spikelets 1-several-flowered, in 1-sided spikes which are digitate or paniculate, sometimes solitary.

* Spikelets all alike.

+ Spikelets strictly 1-flowered, no sterile lemma.

++ Rhachilla articulated below the glumes.

48. **Spartina.** Glumes narrow, unequal.
49. **Beckmannia.** Glumes broad, boat-shaped, inflated, equal.

++ ++ Rhachilla articulated above the glumes.

50. **Cynodon.** Spikes digitate; plants extensively creeping.
51. **Schedonnardus.** Spikes paniculate; plants caespitose.

+ + Spikelets with more than 1 floret.

++ Perfect floret 1, additional florets staminate, neuter or rudimentary.

= Lowest floret perfect

52. **Gymnopogon.** Spikelets remote, appressed.
53. **Chloris.** Spikelets imbricated; fertile lemma 1-awned or awnless; spikes more or less whorled or digitate.
54. **Bouteloua.** Spikelets imbricated; fertile lemma 3-awned; spikes racemose.

= = Lowest florets neuter, third perfect.

55. **Ctenium.** Spike solitary; second glume bearing a stout divergent dorsal awn.

++ ++ Perfect florets 2 or more.

= Spikes few, stout, digitate.

56. **Dactyloctenium.** Rhachis of spike prolonged beyond the spikelets; second glume and at least lowest lemma cuspidate.
57. **Eleusine.** Rhachis of spike not prolonged beyond the spikelets, neither glumes nor lemmas cuspidate.

= = Spikes numerous, very slender, racemose.

58. **Leptochloa.** Spikelets not crowded, often slightly pediceled.

* * Spikelets unisexual, dissimilar; plants dioecious or monoecious.

59. **Buchloë.** Staminate spikes exserted, racemose; pistillate spikelets nearly capitate, partially included in broad sheaths.

Tribe IX. FESTÙCEAE. Spikelets 2-many-flowered, usually perfect, pedicellate in racemes or in loose or dense panicles; glumes shorter than the lowest floret; lemmas 1-several-nerved, awnless or with 1-several straight awns, terminal or borne just below the apex.

* Rhachilla clothed with long silky hairs, exceeding the florets.

60. **Phragmites.** Lowest floret staminate, the others perfect.

* * Rhachilla naked or with hairs much shorter than the florets.

+ Callus and nerves of lemma densely bearded (not cobwebby).

61. **Tridens.** The three nerves or only the middle one excurrent between the acute lobes of the lemma; palea not ciliate-fringed.
62. **Triplasis.** Midnerve excurrent between the truncate lobes of the lemma; palea conspicuously ciliate-fringed; florets remote.

+ + Callus and nerves glabrous or cobwebby, or callus sparsely bearded.

++ Lemma coriaceous, smooth and shining, without a scarious margin.

= Spikelets dioecious.

68. **Distichlis.** Spikelets large, compressed, in a small crowded panicle.

= = Spikelets perfect.

67. **Uniola.** Lower 1–4 lemmas empty.
66. **Diarrhena.** Upper 2–4 lemmas empty.

++ ++ Lemmas membranaceous, or if subcoriaceous having a scarious margin.

= Lemmas 3-nerved. (*Koeleria* might be looked for here, but the upper glume about equals the lower floret.)

63. **Eragrostis.** Spikelets 3-many-flowered.

64. **Catabrosa.** Spikelets 2-flowered.

= = Lemmas 5-many-nerved (nerves often obscure in *Briza*).

a. Spikelets nearly sessile in dense 1-sided clusters at the end of the few panicle-branches.

70. **Dactylis.** Spikelets flattened; glumes and lemmas keeled, the keels hispid-ciliate.

a a. Spikelets not in dense 1-sided clusters.

b. Spikelets as broad as long, somewhat heart-shaped.

69. **Briza.** Florets crowded in the spikelets, almost horizontal; lemmas boat-shaped or ventricose

b b. Spikelets much longer than broad, not heart-shaped.

c. Lemmas keeled.

71. **Poa.** Base of florets often cobwebby.

c c. Lemmas convex or keeled only at the summit.

d. Uppermost lemmas shaped like the lower, fertile or sterile.

e. Nerves of lemma prominent, parallel.

73. **Glyceria.** Spikelets compressed-cylindrical or little flattened; lemmas scarious at summit.

e e. Nerves of lemma not prominent.

f. Lemmas obtuse, awnless.

74. **Puccinellia.** Glumes much shorter than the lowest lemma; callus not hairy; nerves not excurrent.

72. **Scholochloa.** Glumes nearly as long as lowest lemma; callus hairy; one or more nerves of lemma excurrent.

f f. Lemmas acute, often awned.

75. **Festuca.** Lemmas entire, often awned from the apex.

76. **Bromus.** Lemmas 2-toothed, usually awned just below the apex; grain adherent to the palea, pubescent at the summit.

65. **Melica.** Lemmas awned just below the apex, grain free, glabrous.

d d. Uppermost lemmas broad or cucullate, convolute, forming a club-shaped mass.

65. **Melica.** Lemmas subcoriaceous with a scarious margin, obtuse.

Tribe X. HÓRDEAE. Spikelets (1-several-flowered, with uppermost floret imperfect) sessile on opposite sides of a zigzag jointed channeled rhachis, forming a spike; glumes sometimes abortive or wanting, often placed together in front of the spikelet; leaf-blades bearing at base a more or less well-marked pair of auriculate appendages.

* Spikelets solitary at each joint of the rhachis.

+ Spikelets 1-flowered, falling attached to joints of the disarticulating rhachis.

78. **Lepturus.** Spikelets awnless; low branching annuals.

+ + Spikelets 2-many-flowered.

77. **Lolium.** Spikelets placed with one edge to the rhachis.

79. **Agropyron.** Spikelets placed with the side to the rhachis.

* * Spikelets 2 or 3, rarely solitary, at each joint of the rhachis, placed with the florets dorso ventral to the rhachis.

+ Spikelets not all alike.

80. **Hordeum.** Spikelets 1(rarely 2-3)-flowered, in 3's at each joint, the lateral pair pediceled, usually abortive; glumes awn-like.

+ + Spikelets all alike, 2-6-flowered.

81. **Elymus.** Glumes usually equaling the florets; spikes mostly dense.

82. **Hystrix.** Glumes reduced to short bristles, one or both often obsolete; spikes very loose.

Tribe XI. BAMBÙSEAE. Tall woody reeds; the flat blades with a short petiole articulated with the sheath; spikelets few-many-flowered, flattened, in panicles or racemes.

83. **Arundinaria.** Lemmas rounded on the back, many-nerved, acuminate or bristle-pointed; glumes very small.

1. TRÍPSACUM L. Gama Grass. Sesame Grass

Spikelets unisexual, the staminate spikelets in pairs at the joints of the continuous rhachis above; the pistillate spikelets solitary, embedded in each oblong joint of the cartilaginous thickened articulate rhachis below in the same inflorescence, which terminates the culm or its branches; glumes of the staminate spikelet subcoriaceous, the first dorsally flattened, the second boat-shaped; the first lemma often empty, membranaceous with a hyaline palea, like the second which incloses a staminate flower; first glume of pistillate spikelet ovate, at length cartilaginous and closing the recess in the rhachis, second boat-shaped, coriaceous; florets 2, the lemmas and paleas hyaline, the lower sterile, the upper pistillate. — Tall stout perennials from very thick creeping rootstocks, with broad flat leaves, and terminal and axillary spikes separating spontaneously into joints at maturity. (Name from *τρίβειν, to rub*, perhaps in allusion to the polished spike.)

46. T. dactyloides.
Part of spike × 1½.
♀ Spikelet embedded × 1.
♀ Spikelet freed × 1.
♂ Spikelet × 1.

1. T. dactyloides L. Culms 1–2.5 m. high; leaves 3 dm. or more long, 1.5–3.5 cm. wide; spikes 2–3 together at the summit, when their contiguous sides are more or less flattened, or solitary and terete; axillary spikes solitary. — Moist soil, Ct. to Kan., s. to Fla. and Tex. July, Aug. Fig. 46.

2. ROTTBOËLLIA L. f.

Spikelets in pairs in the excavations at the nodes of a cylindrical articulated axis; one sessile and perfect, the other pediceled, sterile, with its pedicel adnate to the rhachis; glumes of the perfect spikelet awnless, the first coriaceous and covering the excavation in the rhachis, the second thinner, boat-shaped; sterile lemma empty or with a rudimentary flower, and, like the lemma and palea, hyaline; glumes of sterile spikelet membranaceous. — Perennials with flat narrow leaves, and single cartilaginous spikes which disarticulate at maturity, terminating the stem and branches; chiefly subtropical. (Named for *Prof. C. F. Rottboell*, an excellent Danish botanist, who wrote much upon *Gramineae*, *Cyperaceae*, etc.)

47. R. rugosa.
Base of inflorescence × ½.
Part of same with fertile and pediceled sterile spikelet separated × 2.
Fertile spikelet × 2.
Its flower removed × 2.
Lemma × 2.

1. R. rugòsa Nutt. *Culms tufted, compressed*, 6–12 dm. high; sheaths flattened; leaves 5–10 mm. wide; *spikes* 2–7 *cm. long*, the *lateral ones on short clustered branches in the axils*, often partly included in inflated sheaths; *first glume of fertile spikelet transversely rugose.* (*Manisuris* Ktze.) — Low pine barrens, Del. and southw., near the coast. Aug., Sept. Fig. 47.

48. R. cylindrica × 2.

2. R. cylíndrica (Michx.) Torr. *Culms terete from a short rootstock;* leaves 2–3 mm. wide; *spikes* slender, usually curved, 5–15 *cm. long*, terminating the culm, *on elongated axillary peduncles;* sterile spikelet rudimentary; *first glume of fertile spikelet obscurely pitted longitudinally.* (*Manisuris* Ktze.) — Prairies, Mo. and southw. June–Aug. Fig. 48.

3. ERIÁNTHUS Michx. Woolly Beard Grass

Spikelets in pairs, one sessile, the other pediceled, along the articulate and readily disjointing rhachis, both alike, perfect; glumes subequal, firm-membranaceous, the first dorsally flattened, more or less bicarinate, the second keeled above; sterile lemma empty, hyaline, awnless; fertile lemma with an awn 1–2 cm.

long; palea minute, nerveless. — Tall and stout reed-like perennials, with elongated flat leaves, racemes crowded in a panicle and clothed with long silky hairs, especially in a tuft around the base of each spikelet (whence the name, from ἔριον, *wool*, and ἄνθος, *flower*).

* *Awn terete, straight.*

+ *Hairs at base of spikelets copious, as long as the glumes or longer; panicle-axis and upper part of culm densely appressed-villous.*

++ *Panicle loose and open; hairs longer than the glumes.*

1. **E. saccharoìdes** Michx. Culm 1–2 m. high, usually with a dense ring of appressed hairs at the nodes; leaves 1–2.5 cm. wide, villous; panicle tawny or purple. — Moist ground, N. J. and southw., rare. Sept., Oct. Fig. 49.

+++ *Panicle dense and compact; hairs about as long as the glumes.*

2. **E. compáctus** Nash. Culm 1–3 m. high, villous at the nodes; blades 6–12 mm. wide, usually villous only on the upper surface near the base; panicle tawny. — Moist ground, N. J. and southw. Aug., Sept.

49. E. saccharoides × 1½.

++ *Hairs at base of spikelets rather sparse or wanting, shorter than the glumes; culm and axis of panicle glabrous or sparsely villous.*

3. **E. brevibárbis** Michx. Culm 1–2 m. high, *sparingly villous at the nodes;* sheaths glabrous; blades 6–10 mm. wide, scabrous; *panicle purple*, narrow, the *branches* appressed, *sparingly silky, appearing striate from the stiff straight awns.* — Moist ground, Del. and southw. Sept., Oct.

** *Awn flattened and twisted.*

+ *Panicle pale, axis very villous; basal hairs copious, exceeding the glumes.*

4. **E. divaricàtus** (L.) Hitchc. Culm 1.5–3 m. high, nodes and upper portion appressed-villous; sheaths glabrous; leaves 1.5–2.5 cm. wide; panicle loose, silky. (*E. alopecuroides* Ell.) — Moist ground, N. J. to Ga., w. to Ky. and s. Mo. Sept.

++ *Panicle dark, axis sparsely villous; basal hairs rather sparse, scarcely as long as the glumes.*

5. **E. contórtus** Baldw. Culm 1–2 m. high, nodes soon glabrous; sheaths glabrous; leaves 5–15 mm. wide; panicle narrow, less silky than in the preceding. — Low meadows, Va. to Ky., and southw.

4. ANDROPÒGON [Royen] L. Beard Grass

Spikelets in pairs (one sessile and perfect, the other pediceled, sterile, often rudimentary) at each joint of the articulate rhachis; glumes of fertile spikelet subequal, indurated, the first dorsally flattened, with a strong nerve near each margin, the midnerve faint; second glume keeled above; first lemma empty, hyaline; fertile lemma membranaceous or hyaline, awned; palea hyaline, sometimes obsolete. — Tall tufted perennials; spikes lateral and terminal, the rhachis and usually the pedicels long-villous with silky hairs (whence the name, composed of ἀνήρ, *man*, and πώγων, *beard*.)

Racemes solitary; joints of the rhachis clavate . . . . . 1. *A. scoparius.*
Racemes in fascicles of 2–6; joints of the rhachis not clavate.
  Pedicellate spikelet reduced to the pedicel or the glumes only; racemes usually subtended by a foliaceous spathe (the upper sheath); rhachis-joints very slender.
  Racemes not longer than the spathe, which incloses the common peduncle.
    Branches of inflorescence in a dense terminal corymbiform cluster . 2. *A. glomeratus.*
    Branches of inflorescence scattered along the culms . . . . . 3. *A. virginicus.*
  Racemes, or some of them, on peduncles exserted beyond the spathes.
    Upper sheaths inflated; racemes delicate, flexuous . . . . . 4. *A. Elliottii.*
    Upper sheaths not inflated; racemes stouter, strict . . . . . 5. *A. ternarius*
Pedicellate spikelet staminate, with glumes and lemmas . . . . 6. *A. furcátus.*

§ 1. SCHIZACHÝRIUM (Nees) Trin. *Racemes solitary; joints of the rhachis clavate.*

50. A. scoparius. Two spikelets × 1⅓.

1. **A. scopàrius** Michx. Culms tufted, 4–12 dm. high; branches single or in pairs from the upper sheaths; sheaths glabrous or hairy; blades often hairy above near the base; racemes slender, 2–6 cm. long, joints and sterile pedicels hairy on the margins; sterile spikelet a single awn-pointed glume, 2–4 mm. long; fertile spikelet about 7 mm. long; awn bent and twisted. — Dry ground, N. B. to Sask., and southw. July–Sept. Fig. 50.

Var. **littoràlis** (Nash) Hitchc. Culms in large tufts; the innovations and lower sheaths strongly compressed, glaucous. (*A. littoralis* Nash.) — Sand dunes along the coast, N. Y. and southw.

§ 2. CAMPYLOMÍSCHUS Fourn. *Racemes in fascicles of 2–6; joints of the rhachis not clavate.*

* *Pedicellate spikelet sterile, consisting of 1–2 glumes or reduced to a pedicel.*

← *Spathes equaling or exceeding the racemes; sheaths keeled.*

2. **A. glomeràtus** (Walt.) BSP. Culms stout, 0.5–1.5 m. high, leafy; sheaths usually sparsely hirsute; *inflorescence bushy-branched at the summit of the culm; spathes very scabrous;* racemes 2; the slender joints of the rhachis and the sterile pedicel clothed with long silky hairs. (*A. macrourus* Michx.; *A. corymbosus* Nash.) — Sandy ground near the coast, Mass. and southw. Sept., Oct.

3. **A. virgínicus** L. *Culms rather slender*, 5–12 dm. high, *sparingly branched above;* sheaths smooth or somewhat hirsute on the margin; blades usually hirsute above near the base; *spathes smooth;* racemes 2 or 3, slender; hairs long and silky. — Open ground, Mass. to Ill., Fla., and Tex. Fig. 51.

51. A. virginicus. Three spikelets × 2⅔.

← ← *Racemes, or some of them, on peduncles exserted beyond the spathes.*

4. **A. Ellióttii** Chapm. Culms in tufts, flattened at base, 5–10 dm. high; lower sheaths and leaves appressed-hirsute or becoming nearly glabrous, *upper sheaths aggregated and much enlarged; racemes* usually 2, *very slender, flexuous, softly and loosely silky; spikelets 4 mm. long.* — Dry sandy or gravelly soil, Del. to Mo., and southw. Sept., Oct.

52. A. furcatus × 1⅓.

5. **A. ternàrius** Michx. Culms somewhat stouter and taller than in the preceding; sheaths usually smooth, *the upper sheaths not crowded nor enlarged* (or the upper one only somewhat enlarged); *racemes* 2 or 3, *stouter, more strict, densely silky; spikelets 6 mm. long.* (*A. argyraeus* Schultes.) — Dry sandy soil, Del. to Tenn., and southw. Aug.–Oct.

* * *Pedicellate spikelet staminate; racemes 2–6 on a long exserted peduncle; rhachis-joints stout.*

6. **A. furcàtus** Muhl. Culms robust, in large tufts, 1–1.5 m. high, branching from the upper nodes; sheaths glabrous; blades elongated, 4–8 mm. wide, scabrous on the margins and often hirsute on the upper surface near the base; racemes 5–12 cm. long, stout, usually purplish; rhachis-joints and pedicels hairy on the sides and at the summit; sessile spikelets 8–9 mm. long; staminate spikelet slightly longer. — Dry open ground, Me. to Sask., and southw. Fig. 52.

5. SORGHÁSTRUM Nash

Spikelets sessile at each joint of the slender rhachis of the peduncled racemes, which are reduced to 2 or 3 joints, the sterile spikelets reduced (in our species) to hairy pedicels; glumes indurated as in *Andropogon;* sterile lemma thinly hyaline, the fertile lemma reduced to hyaline appendages to the strong awn; palea obsolete. — Perennial grasses with tall stout culms, the racemes arranged in open panicles. (Named from its resemblance to *Sorghum.*)

1. S. nùtans (L.) Nash. (Indian Grass, Wood Grass.) Culm simple, 1–2 m. high; leaves 6–10 mm. wide, scabrous, glaucous; sheaths smooth; panicle narrowly oblong, at first open, contracted after flowering, 1–3 dm. long; the spikelets lanceolate, at length drooping, yellowish or reddish brown and shining, clothed, especially toward the base, with fawn-colored hairs; the twisted awn longer than the spikelet. (*Andropogon* L.; *Chrysopogon* Benth.) — Dry soil, Me. to Man., and southw. Fig. 53.

53. S. nutans × 2.

Sórghum halepénse (L.) Pers., Johnson Grass, a more robust plant, is found as an escape or a weed, chiefly along the southern border of our range. It differs from *Sorghastrum* in having two pediceled spikelets (of the group of three) staminate or empty; and in having a more spreading panicle and a firmer lemma. This is thought by some to be the original of the cultivated sorghums. (Introd. from Eu.)

6. DIGITÀRIA Scop. Finger Grass

Spikelets 1-flowered, lanceolate-elliptic, sessile or short-pediceled, solitary or in 2's or 3's, in two rows on one side of a continuous narrow or winged rhachis, forming simple slender racemes which are aggregated toward the summit of the culm; glumes 1–3-nerved, the first sometimes obsolete; sterile lemma 5-nerved; fertile lemma leathery-indurated, papillose-striate, with a hyaline margin not inrolled, inclosing a palea of like texture. — Annual, mostly weedy grasses, with branching culms, thin leaves, and subdigitate inflorescence. (Name from *digitus*, a finger.) Syntherisma Walt.

* *Rhachis of racemes with angles wingless; first glume obsolete; culms erect.*

1. D. filifórmis (L.) Koeler. Usually tufted, branching and leafy at the base; culms slender or almost filiform, 2–7 dm. high; *lower sheaths hirsute;* blades 0.5–2 dm. long, 4 mm. or less wide (rarely wider), hirsute or glabrous on the lower, scabrous on the upper surface; racemes 1–5, unequal, 3–10 cm. (rarely 15 cm.) long, very slender; *spikelets* 1.7 *mm. long*, mostly in 3's, appressed, the second and third on slender flexuous pedicels; *glume and sterile lemma densely or sparsely villous between the nerves with white gland-tipped hairs;* the glume shorter and narrow, exposing the dark brown acute fertile lemma. (*Panicum* L.) — Sterile or sandy soil, N. H. to Mich., I. T., and southw. July–Sept.

2. D. villòsa (Walt.) Ell. Similar to the preceding, usually taller, less slender and *more densely and constantly hirsute on the sheaths and on both surfaces of the blades; racemes* 2–8, *more distant* (sometimes 3 cm. apart), 5–20 *cm. long, much interrupted toward the base;* spikelet-clusters usually rather distant; *spikelets* 2.25 *mm. long; the glume and sterile lemma densely matted-villous between the nerves with gland-tipped hairs.* — Sandy soil, Va. to Mo., and southw. July–Oct.

* * *Rhachis of racemes with lateral angles winged; culms spreading.*

+ *Pedicels terete; first glume obsolete.*

3. D. humifùsa Pers. *Glabrous;* culms 1.5–4 dm. high, much branched below, ascending or nearly prostrate; leaves 2–10 cm. long (rarely longer), 3–6 mm. wide; racemes 2–6, aggregated, divergent, often curved, 3–10 cm. long;

spikelets solitary or in 2's, 2.2 *mm. long;* the *glume and sterile lemma equal, densely short-villous between the nerves, as long as the dark brown fertile lemma.* (*Panicum lineare* Krock; *P. glabrum* Gaud.) — Cultivated and waste ground, N. S. to S. Dak., and southw. Aug.–Oct. (Nat. from Eu.) Fig. 54.

54. D. humifusa. Spikelet × 4.

4. D. serótina Michx. Extensively creeping, forming dense mats; *the crowded sheaths pilose; blades* 2–8 cm. long, 4–7 mm. wide, *pilose on both surfaces;* racemes 3–8, at the apex of ascending branches (1–3 dm. high), 3–10 cm. long; *spikelets* mostly in 2's, 1.6 *mm. long, sparsely pubescent between the nerves; the glume scarcely* ½ *as long as the pale fertile lemma.* (*Panicum* Trin.) — Low sandy ground near the coast, s. Pa., Del., and southw. June–Aug.

+ + *Pedicels sharply angled; first glume present, minute.*

5. D. sanguinàlis (L.) Scop. (Crab Grass.) Culms erect or ascending from a decumbent often creeping base, 3–12 dm. long; nodes and sheaths more or less papillose-hirsute; blades lax, 5–12 cm. long, 4–10 mm. wide, scabrous, often more or less pilose; racemes 3–12, subfasciculate, 5–18 cm. long; *spikelets* in pairs, 3–3.5 *mm. long,* usually appressed-pubescent between the smooth or scabrous nerves; second glume about ½ as long as the *pale or grayish fertile lemma.* (*Panicum* L.; *Syntherisma fimbriata* Nash.) — Cultivated and waste grounds, throughout our range, and southw. Aug.–Oct. Very variable. (Nat. from Eu.) Fig. 55.

55. D. sanguinalis. Part of inflorescence × ⅓ Spikelets × 8.

7. LEPTOLÒMA Chase

Spikelets 1-flowered, fusiform, solitary on long capillary 3-angled pedicels; first glume obsolete or very minute, the second 3-nerved, nearly as long as the 5–7-nerved sterile lemma; fertile lemma cartilaginous-indurated, papillose, with a delicate hyaline margin not inrolled, inclosing a palea of like texture; grain free within the lemma and palea. — Tufted perennials, with flat leaves and very diffuse terminal panicles, which break away at maturity and become tumble-weeds. (Name from λεπτός, *delicate,* and λῶμα, *border,* in reference to the hyaline margins of the lemma.)

1. L. cognàtum (Schultes) Chase. (Fall Witch Grass.) Pale green, much branched at the base, erect or geniculate below, *very brittle,* 3–7 dm. high; lower sheaths pilose, the upper usually glabrous; *ligule membranaceous,* 1 mm. long; blades 5–8 cm. long, 4–6 mm. wide, rather rigid, usually glabrous, scabrous on the margins; panicle ⅓–½ the entire height of the plant, short-exserted, very diffuse, as broad as long or broader; the capillary scabrous subflexuous branches at first ascending, soon widely spreading, naked below, *pilose in the axils;* spikelets on scabrous pedicels, 1–4 cm. long, acuminate, 2.7–3 mm. long; *glume and sterile lemma with a stripe of appressed silky pubescence between the nerves and on the margins, or the hairs becoming loose and spreading especially on the margins,* very variable in the same panicle; fruit acuminate, chestnut, the margins of the lemma white. (*Panicum* Schultes; *P. autumnale* Bosc.) — Dry soil and sand hills, N. H. to Fla.; Ill. to Minn., southw. and southwestw.

8. AMPHICÁRPON Kunth

Spikelets 1-flowered, of 2 kinds, one in a terminal panicle, perfect but not fruitful, the other subterranean, cleistogamous, on slender leafless stems at the base of the culm; the first glume of the aërial spikelets variable in size or obsolete; the second and the sterile lemma subequal; lemma and palea indurated, margins of lemma neither hyaline nor inrolled: cleistogamous spikelets much

larger, glumes many-nerved; sterile lemma subrigid; fertile lemma and palea much indurated, acuminate, margins of lemma neither hyaline nor inrolled.—Erect annuals or perennials with flat leaves. (Name from ἀμφίκαρπος, *doubly fruit-bearing.*)

1. A. Púrshii Kunth. Annual; culms erect, branching, 3–6 dm. high; sheaths and blades coarsely hispid; terminal panicle contracted; spikelets about 4 mm. long; fertile spikelets solitary, about 6 mm. long, at the ends of the slender subterranean branches. (*Milium Amphicarpon* Pursh; *A. Amphicarpon* Nash.)—Moist sandy pine barrens, N. J. to Fla. Sept. FIG. 56.

56. A. Purshii. Sterile spikelet closed × 2. Same wide open × 2. Basal fertile spikelet, partly open × 2.

9. PÁSPALUM L.

Spikelets 1-flowered, plano-convex, nearly sessile, solitary or in pairs, in 2 rows on one side of a continuous narrow or dilated rhachis, forming simple spike-like racemes; spikelets placed with the back of the fertile lemma toward the rhachis; first glume obsolete (rarely present); lemma and palea chartaceous-indurated, margins of the lemma inrolled.—Perennials, with 1–several racemes digitate or racemose at the summit of the culm and branches. (Πασπάλος, a Greek name for millet.)

a. Racemes 1–several, 1 terminal and often 1 or more lateral *b.*
- *b.* Rhachis membranaceous, 2 mm. or more broad.
  - Spikelets 1.5 mm. long, elliptical, pubescent . . . . . 1. *P. mucronatum*
  - Spikelets 2 mm. long, oval, glabrous . . . . . 2. *P. dissectum.*
- *b.* Rhachis narrow, not membranaceous, less than 1 mm. broad (except in *P. Boscianum*) *c.*
  - *c.* Axillary peduncles 1 or more from uppermost sheath; leaves ciliate on the margin *d.*
    - *d.* Spikelets 2 mm. long *e.*
      - *e.* Leaves glabrous on both surfaces . . . . . 5. *P. ciliatifolium.*
      - *e.* Leaves puhescent on one or both surfaces *f.*
        - *f.* Spikelets glabrous.
          - Leaves densely long-pubescent.
            - Culm hirsute below raceme . . . . . 6. *P. pubescens.*
            - Culm glabrous . . . . . 7. *P. Muhlenbergii.*
          - Leaves puherulent and sometimes sparsely villous . 8. *P. stramineum.*
        - *f.* Spikelets puhescent; leaves short-pubescent.
          - Culms erect . . . . . 9. *P. Bushii.*
          - Culms prostrate . . . . . 10. *P. psammophilum.*
    - *d.* Spikelets 1.5 mm. long.
      - Spikelets glahrous . . . . . 3. *P. longipedunculatum*
      - Spikelets puhescent . . . . . 4. *P. setaceum.*
  - *c.* Axillary peduncles none *g.*
    - *g.* Spikelets glabrous *h.*
      - *h.* Spikelets singly disposed so as to appear in 1–2 rows.
        - Spikelets 2.5 mm. long.
          - Plants glahrous or sparingly pilose.
            - Leaf-blades of culm 1–2 dm. long, racemes 3–5 cm. long . . . . . 11. *P. laeve.*
            - Leaf-blades of culm 2–4 dm. long; racemes 8–10 cm. long . . . . . 12. *P. angustifolium.*
          - Plants with pubescent sheaths and blades . . . 13. *P. plenipilum.*
        - Spikelets 3 mm. long; sheaths papillose-hirsute . . 14. *P. circulare.*
        - Spikelets 4 mm. long.
          - Leaf-hlades less than 1.5 dm. long . . . . 16. *P. difforme.*
          - Leaf-hlades 2–4 dm. long . . . . . 15. *P. floridanum.*
      - *h.* Spikelets in pairs so as to appear in four rows.
        - Spikelets stramineous at maturity . . . . . 17. *P. laeviglume.*
        - Spikelets dark hrown at maturity . . . . . 18. *P. Boscianum.*
    - *g.* Spikelets ciliate . . . . . 19. *P. dilatatum.*
- *a.* Racemes a pair at the summit of the culm . . . . . 20. *P. distichum.*

* *Racemes with a broad, thin-membranaceous, or foliaceous and keeled, rhachis, 2 mm. wide or more, the incurved margins partly inclosing the small 2-rowed spikelets.* (*Aquatic or nearly so, decumbent or floating.*)

1. P. mucronàtum Muhl. Sheaths papillose-hirsute or nearly smooth, inflated; *blades* lanceolate, 2.5–15 cm. long, 6–14 *mm. wide*, scabrous; *racemes* 10–50, finally spreading; rhachis extending beyond the *spikelets*, which are *ellip-*

tical, about 1–5 mm. long, sparsely pubescent with minutely glandular hairs (*P. fluitans* Ell.) — In water or mud, Va. to Okla., and southw.

2. **P. disséctum** L. Sheaths glabrous; *blades* 1–5 cm. long, 2–4 *mm. wide, racemes* 3–7; *spikelets oval, glabrous*, 2–2.3 *mm. long.* (*P. membranaceum* Walt.; *P. Walterianum* Schultes.) — Wet places, N. J. to s. Ill., and southw.

* * *Racemes with a narrow wingless rhachis; sheaths compressed.*

← *One raceme terminal, often* 1–*several lateral.*

↔ *One or more naked raceme-bearing branches from the uppermost sheath; culms tufted, often reclining; racemes slender, often curved; spikelets in pairs*, 1.5–2 *mm. long, broadly oval or obovate; leaves ciliate on the margin.*

= *Spikelets* 1.5 *mm. long.*

3. **P. longipedunculàtum** Le Conte. *Culms reclining*, 3–5 dm. long; *leaves mostly near the base*, 3–9 *cm. long*, 4–6 *mm. wide, midnerve and margins ciliate;* sheaths pilose at the throat; racemes 1 or 2, 3–6 cm. long, usually curved, on long slender peduncles; *spikelets glabrous.* — Sandy soil, Ky. and southw.

4. **P. setàceum** Michx. *Culms slender, erect or ascending*, 4–6 dm. high, smooth; *sheaths hirsute*, especially the lower ones; *blades* about 1–2 dm. long, 2–6 *mm. wide* (upper reduced), densely pubescent; *racemes* slender, usually single, *long-peduncled*, 5–10 cm. long; *spikelets ovate, finely pubescent and glandular-spotted.* — Dry sandy fields and pine barrens, N. H. to Neb., Fla., and Tex. Aug.–Oct.

= = *Spikelets* 2 *mm. long.*

a. Spikelets glabrous.

5. **P. ciliatifòlium** Michx. *Erect*, 4–8 dm. high; *leaves* 0.7–2.5 *dm. long*, 6–15 *mm. wide, glabrous;* racemes usually single, 5–10 cm. long; *spikelets about* 2 *mm. long*, glabrous, green. — Sandy soil, Md. to Fla., and Miss.

6. **P. pubéscens** Muhl. *Culms slender, erect*, 4–8 dm. high, *hirsute below the racemes; sheaths usually glabrous; blades* 1–2 *dm. long*, 3–6 *mm. wide, long-pubescent on both surfaces; racemes usually single; spikelets* 2 *mm. long, glabrous.* — Fields and dry woods, N. Y. to Del., Miss., and Tex. Aug., Sept.

7. **P. Muhlenbérgii** Nash. *Culms* more robust than in the preceding, *spreading or reclining, glabrous;* sheaths pubescent or nearly glabrous; *blades* hardly 2 dm. long, 7–10 *mm. wide*, long-pubescent on both surfaces; racemes usually single; spikelets 2 mm. long, glabrous. — Fields and sandy soil, N. H. to Mo., southw. to Fla. and Tex. Aug.–Oct.

8. **P. stramíneum** Nash. *Culms spreading or prostrate*, 2–8 dm. long; sheaths ciliate on the margin, otherwise glabrous or the lowest pubescent; *blades* about 1 dm. long, *crinkly on the ciliate margin, finely pubescent, often with a few scattered long hairs; racemes* 1–3 (mostly 2), 4–10 *cm. long; spikelets* straw-colored, 2 mm. long, *orbicular, smooth.* — Sandy soil, Neb. to Mo. and southw. July–Sept.

a a. Spikelets pubescent.

9. **P. Búshii** Nash. *Culms erect*, 8–10 dm. high; *lower sheaths pubescent, the upper pilose on the margin only;* blades 5–20 cm. long, 5–15 mm. wide, softly and densely pubescent on both surfaces; *racemes* 2 or 3, 10–12 *cm. long;* spikelets 2–2.2 mm. long, oval, densely pubescent. — Dry soil, Neb. to Mo., and Tex. Aug.

10. **P. psammóphilum** Nash. *Culms prostrate;* similar to *P. stramineum* but *sheaths, both surfaces of the blades, and the oval spikelets softly and densely pubescent;* leaves averaging a little longer. (*P. prostratum* Nash., not Scribn. & Merr.) — Sandy soil, s. N. Y. to Del. Aug., Sept.

↔ ↔ *No lateral peduncle; culms stout and often tall.*

= *Spikelets obtuse, glabrous.*

a. Spikelets singly disposed.

11. **P. laève** Michx. Culms spreading or prostrate, 3–6 dm. long; plant

glabrous, or the upper surface of the leaf-blades (1–2 dm. long) with a few hairs; *racemes* 2–3, 3–5 *cm. long; spikelets about* 2.5 *mm. long.* — Sandy soil, Md. to Fla. and Tex. FIG. 57. Var. AUSTRÀLE Nash. *Leaves hairy on the upper surface, sheaths hirsute on the margin.* — Va. to Fla. and Miss.

57. P. laeve × ½. Spikelets × 2½.

12. **P. angustifòlium** Le Conte. *Culms* erect or spreading, glabrous, *averaging taller than the preceding;* sheaths glabrous or somewhat pilose, especially on the margin; *blades elongated* (2–4 dm.), often sparingly pilose on upper surface; *racemes* 3–5, *longer* than in the preceding, 6–10 cm. long, *spreading.* — Sandy soil, Md. to Fla., Kan., and Tex.

13. **P. plenípilum** Nash. Resembles *P. laeve;* but usually taller (5–10 dm.), erect or spreading; and pilose on sheaths and blades; racemes 2–4, 4–8 cm. long. (*P. praelongum* Nash.) — Fields and open ground, N. J. to Fla., Ala., and Mo.

14. **P. circulàre** Nash. Culms 5–10 dm. high; *sheaths sparsely papillose-hirsute with ascending hairs; blades* 2–3 *dm, long,* 5–8 mm. wide, sparsely hirsute on the upper surface, usually glabrous on the lower; *racemes* 2–4, erect or ascending, 6–10 *cm. long; spikelets orbicular, about* 3 *mm. long.* — Open moist ground, N. Y. and Mo., southw.

15. **P. floridànum** Michx. *Culms robust,* 1–2 *m. high, from a stout scaly rootstock,* glabrous; *sheaths hirsute; blades* 3–6 *dm. long,* 6–10 *mm. wide, hirsute on both surfaces;* racemes usually 2–4, stout, erect or ascending, 7–12 cm. long; *spikelets about* 4 *mm. long.* — Low ground, Va. to Fla. and Tex. Var. GLABRÀTUM Engelm. *Glabrous and often glaucous;* racemes often 4–7. (*P. arundinaceum* Poir.) — Del. to s. Kan., and southw.

16. **P. diffórme** Le Conte. Similar to the preceding, less robust, glaucous; *culms* 5–10 *dm. high, leafy at the base;* sheaths often papillose-hirsute near the summit; *blades* 12–15 *cm. long,* 6–10 *mm. wide* (the uppermost much reduced), *glabrous or sparsely hirsute;* racemes 2–3 (rarely 4), ascending, 3.5–8 cm. long; *spikelets* 3–3.5 *mm. long.* — Low sandy ground, N. J. to Fla. and Tex.

a a. Spikelets in pairs, appearing 4-*seriate; sterile lemma* 5-*nerved; culms usually geniculate and rooting at the lower nodes.*

17. **P. laeviglùme** Scribn. Culms stout, 5–15 dm. high, nodes pubescent; sheaths usually pilose on the scarious margin, otherwise glabrous; blades 1–3 dm. long, 1–1.5 cm. wide, glabrous or with a few hairs at base; racemes 4–8, 3–10 cm. long; *spikelets* 3 *mm. long,* obovate, *stramineous.* — Moist fields and wood-borders, Md. and Ky. to N. C. and Tex. Sept., Oct.

18. **P. Bosciànum** Flügge. Culms stout, 5–12 dm. high; sheaths lax, glabrous, or the lower pubescent; blades 1.5–4.5 dm. long, 6–12 mm. wide, glabrous or hirsute near base; racemes numerous, 2–6 cm. long, with a winged rhachis 2 mm. wide; *spikelets* 2 *mm. long; glume and sterile lemma brownish; fruit dark brown.* — Low woodlands, and along ditches, Va. to Fla. and Tex. Aug., Sept.

= = *Spikelets acute, ciliate.*

19. **P. dilatàtum** Poir. Culms stout, 5–17 dm. high, growing in clumps; glabrous throughout except the densely crowded spikelets; leaves elongated, 4–10 mm. wide; racemes 2–10, 5–10 cm. long, somewhat spreading; spikelets 3 mm. long, ovate; glume and sterile lemma long-ciliate. — In meadows, waste ground, and along ditches, Va. to Fla. and Tex.

+ + *Racemes a pair at the summit of the culm.*

20. **P. dístichum** L. Creeping and rooting at the nodes, with ascending culms, 1–6 dm. high; leaves short, usually crowded, sometimes sparsely hairy on the margins; racemes 3–5 cm. long; spikelets singly disposed, 2.5–3 mm. long, ovate, acute, sparsely pubescent; first glume occasionally present. (*Digitaria paspalodes* Michx.) — Ditches and muddy or sandy shores, Va. to Fla., and westw. June–Oct.

10. AXÓNOPUS Beauv.

Spikelets 1-flowered, compressed bi-convex, sessile, solitary in two rows on one side of a flattened rhachis (which is naked in ours), placed with the back of the fertile lemma turned from the rhachis, forming simple spikes; first glume obsolete; lemma and palea indurated but less so than usual in *Paspalum*, margins of the lemma inrolled. — Perennials with 2–several slender spikes digitate or sub-digitate at the summit of the culm. (Name from ἄξων, *axis;* and πούς, *foot.*) ANASTROPHUS Schlecht.

1. A. furcàtus (Flügge) Hitchc. Tufted, soft, 3–10 dm. high, with long creeping leafy stolons; leaves obtuse; racemes a pair at the summit of the culm, 7–10 cm. long; spikelets acute, nearly glabrous, about 4 mm. long. (*Paspalus* Flügge; *P. Elliottii* Wats.) — Low moist ground, Va. to Fla. and Tex.

11. PÁNICUM L. PANIC GRASS

Spikelets 1-flowered or rarely with a staminate flower below the terminal perfect one, in panicles, rarely in racemes; glumes very unequal, the first often minute, the second subequal to the sterile lemma which often incloses a hyaline palea and rarely a staminate flower; fertile lemma and palea chartaceous-indurated, nerves obsolete, the margins of the lemma inrolled; grain free within the rigid firmly closed lemma and palea. — Annuals or perennials of various habit. (An ancient Latin name of the Italian millet, *Setaria italica*, of uncertain origin and meaning.)

a. Annuals · *b.*
- *b.* Spikelets tuberculate . . . . . 2. *P. verrucosum.*
- *b.* Spikelets smooth *c.*
  - *c.* Plants glabrous . . . . . 8. *P. dichotomiflorum*
  - *c.* Plants more or less hispid *d.* — CAPILLÀRIA.
    - *d.* Panicle erect, spikelets not over 3.5 mm. long *e*
      - *e.* Panicle more than half the length of the entire plant.
        - Panicle diffuse; spikelets 2–2.5 mm. long . . . . 3. *P. capillare.*
        - Panicle narrow; spikelets 3–3.5 mm. long . . . . 5. *P. flexile.*
      - *e.* Panicle not over one third the length of the entire plant.
        - Culms stout; blades about 1 cm. wide . . . . . 4. *P. Gattingeri.*
        - Culms delicate; blades not over 6 mm. wide . . . . 6. *P. philadelphicum*
    - *d.* Panicle drooping; spikelets 5 mm. long . . . . . 7. *P. miliaceum.*

a. Perennials *f.*
- *f.* Spikelets short-pediceled along one side of a rhachis forming spike-like racemes . . . . . 1. *P. hemitomum.*
- *f.* Spikelets in panicles *g.*
  - *g.* Basal leaves similar to culm-leaves, not forming a winter rosette; culms simple or sometimes producing panicles from the upper nodes *h.*
    - *h.* Spikelets long-pediceled. — VIRGÀTA.
      - Branches of panicle spreading . . . . . 11. *P. virgatum.*
      - Branches of panicle ascending.
        - Spikelets 4.5 mm. long; leaves crowded at base of culm . 9. *P. amarum.*
        - Spikelets 6 mm. long; leaves not crowded at base of culm 10. *P. amaroides.*
    - *h.* Spikelets short-pediceled along the main branches of the panicle *i.* — AGROSTOÍDIA.
      - *i.* Rootstocks present . . . . . 16. *P. anceps.*
      - *i.* Rootstocks absent; plants compressed at the leafy base.
        - Fruit stipitate; spikelets conspicuously secund . . . 14. *P. stipitatum.*
        - Fruit not stipitate; spikelets not conspicuously secund.
          - Spikelets 2 mm. long, crowded; a few long hairs on the pedicels . . . . . 13. *P. agrostoides.*
          - Spikelets 2.5–3 mm. long; no hairs on the pedicels.
            - Panicles few-flowered, branches spreading . . . 12. *P. longifolium.*
            - Panicles densely flowered, branches erect . . . 15. *P. condensum.*
  - *g.* Basal leaves usually distinctly different from the culm-leaves, forming a winter rosette; culms simple in spring but usually much branched later in the season; secondary panicles smaller, less exserted than the primary *j.* — DICHÓTOMA.
    - *j.* Spikelets 3 mm. or more long *k.*
      - *k.* Leaves linear-elongated, not over 5 mm. wide; secondary panicles at the base only.
        - Spikelets pointed . . . . . 17. *P. depauperatum*
        - Spikelets blunt. . . . . 18. *P. perlongum.*

k. Leaves oblong-lanceolate to ovate-lanceolate, more than 5 mm. wide, or if narrower not conspicuously elongated *l.*
l. Blades more than 1.5 cm. wide *m.*
m. Spikelets 3 mm. long; at least the lower sheaths papillose-hispid 71. *P. clandestinum.*
m. Spikelets 3.5–4 mm. long.
Nodes bearded; plants often pubescent.
Blades lanceolate, thick, glabrous above, densely papillose-pubescent beneath . . . . . 65. *P. Ravenelii.*
Blades ovate-lanceolate, thin; pubescence when present soft . . . . . 72. *P. Boscii.*
Nodes not bearded; plants glabrous or nearly so.
Panicle spreading; blades 2.5 cm. or more wide . . 73. *P. latifolium.*
Panicle narrow; blades rarely over 1.8 cm. wide . . 66. *P. xanthophysum.*
l. Blades not over 1.5 cm. wide *n.*
n. Paniele narrow; blades erect.
Plants glabrous or nearly so . . . . . 66. *P. xanthophysum.*
Plants papillose-hispid.
Spikelets not over 3 mm: long . . . . . 67. *P. Wilcoxianum.*
Spikelets 4 mm. long . . . . . 64. *P. Leibergii.*
n. Panicle spreading, about as wide as long *o.*
o. Spikelets 3 mm. long; blades 1.2–2 dm. long.
Blades ciliate, glaucous, smooth . . . . . 59. *P. mutabile.*
Blades not ciliate, green, scabrous . . . . . 70. *P. aculeatum.*
o. Spikelets 3.5–4 mm. long; blades not over 1 dm. long.
Nodes bearded; ligule 3–4 mm. long . . . . . 65. *P. Ravenelii.*
Nodes not bearded; ligule 1–2 mm. long.
Spikelets obovoid-turgid, blunt; pubescence spreading . . . . . 63. *P. Scribnerianum.*
Spikelets narrowly obovoid, subacute; pubescence appressed . . . . . 62. *P. oligosanthes.*
j. Spikelets less than 3 mm. long *p.*
p. Spikelets glabrous *q.*
q. Spikelets not over 1.5 mm. long.
Plants pubescent . . . . . 22. *P. strigosum.*
Plants glabrous, except bearded nodes . . . . . 31. *P. microcarpon.*
q. Spikelets 2–2.5 mm. long *r.*
r. Spikelets 2 mm. long.
Spikelets obovoid-turgid; culms crisp-puberulent . . 60. *P. lancearium.*
Spikelets elliptical; culms glabrous.
Autumnal state erect, branched like a little tree; second glume shorter than the fruit and sterile lemma . . 27. *P. dichotomum.*
Autumnal state topheavy-reclining; fruit covered by second glume and sterile lemma . . . . . 28. *P. barbulatum.*
Autumnal state widely trailing; second glume and sterile lemma shorter than the fruit . . . . . 30. *P. lucidum.*
r. Spikelets 2.5 mm. long.
Culms 2–4 dm. high; second glume and sterile lemma equaling fruit . . . . . 26. *P. Bicknellii.*
Culms 5–12 dm. high; second glume and sterile lemma forming a point beyond the fruit . . . . . 29. *P. yadkinense.*
p. Spikelets pubescent *s.*
s. Blades elongated, not over 5 mm. wide; secondary panicles from the base only, or none.
Sheaths glabrous . . . . . 20. *P. Werneri.*
Sheaths pilose.
Spikelets turgid, blunt; panicle-branches ascending; culms few in a tuft . . . . . 18 *P. perlongum.*
Spikelets subacute; panicle-branches spreading; culms numerous in a tuft . . . . . 19. *P. linearifolium.*
s. Blades usually not conspicuously elongated; secondary panicles not at the base *t.*
t. Spikelets obovate-turgid, blunt, attenuate at base.
Spikelets 2 mm. long . . . . . 25. *P. aciculare.*
Spikelets 2.5 mm. long.
Spikelets not papillose; culms glabrous . . . . . 26. *P. Bicknellii.*
Spikelets rugose-papillose; culms pubescent, at least below.
Nodes bearded; panicle-branches ascending . . . 24. *P. consanguineum.*
Nodes not bearded; paniele-branches spreading . . 23. *P. angustifolium.*
t. Spikelets not attenuate at base *u.*
u. Sheaths conspicuously retrorse-pilose; culms simple, forming soft tufts . . . . . 21. *P. xalapense.*
u. Sheaths not retrorsely pilose *v.*
v. Sheaths, or all but the lowest, glabrous *w.*
w. Ligule 2–5 mm. long.
Spikelets 2.2 mm. long . . . . . 47. *P. scoparioides.*
Spikelets 1.5 mm. long.
Panicle not more than half as wide as long; spikelets elliptic . . . . . 35. *P. spretum.*
Panicle about as wide as long; spikelets obovoid 36. *P. Lindheimeri.*

w. Ligule less than 1 mm. long *α.*
x. Blades velvety on both surfaces; nodes bearded . . 34. *P. annulum.*
x. Blades not velvety; nodes not bearded *y.*
y. Culms crisp-puberulent . . . . . 58. *P. Ashei.*
y. Culms glabrous *z.*
z. Spikelets 1.5–1.8 mm. long.
Culm-blades not over 2 cm. long; spikelets elliptical 54. *P. ensifolium.*
Culm-blades 6–20 cm. long; spikelets spheroidal.
Panicle not more than half as wide as long; blades strongly nerved . . . . . 56. *P. polyanthes.*
Panicle nearly as wide as long; blades not strongly nerved . . . . . 55. *P. sphaerocarpon.*
z. Spikelets 2.2–2.8 mm. long.
Blades cordate, 1.2–2 cm. wide . . . . . 57. *P. commutatum.*
Blades not cordate, 0.6–1.2 cm. wide.
Blades erect; fruit covered . . . . . 32. *P. boreale.*
Blades spreading; fruit exposed at summit . . 33. *P. mattamuskeetense*
v. Sheaths pubescent *a.*
a. Sheaths puberulent, not pilose.
Spikelets elliptical, 2.6 mm. long . . . . . 58. *P. Ashei.*
Spikelets obovoid-turgid, 2 mm. long.
Plants erect or spreading; blades glabrous above . . 60. *P. lancearium.*
Plants prostrate or creeping; blades puberulent on both surfaces . . . . . 61. *P. patulum.*
a. Sheaths spreading- or appressed-pilose or velvety *b.*
b. Plants grayish-velvety throughout.
Spikelets 2.6 mm. long . . . . . 68. *P. scoparium.*
Spikelets 1.8 mm. long . . . . . 44. *P. lanuginosum.*
Spikelets 1.3–1.4 mm. long, very turgid . . . 45. *P. auburne.*
b. Plants not velvety *c.*
c. Spikelets 2.7–3 mm. long.
Blades papillose-hirsute on both surfaces . . . 67. *P. Wilcoxianum.*
Blades glabrous or sparsely silky above . . . . 49. *P. ovale.*
c. Spikelets less than 2.5 mm. long *d.*
d. Spikelets ovate, pointed; blades 1.5–2.5 dm. long; panicle 1.2–2.5 dm. long . . . . . 69. *P. scabriusculum.*
d. Spikelets obovate or elliptical, blunt; blades and panicle shorter *e.*
e. Pubescence spreading *f.*
f. Spikelets 2.2–2.4 mm. long.
Plants very villous; autumnal state prostrate . 48. *P. villosissimum.*
Plants papillose-hispid on sheaths and sparsely hispid on blades; autumnal state erect . . 47. *P. scoparioides.*
f. Spikelets 1.3–1.9 mm. long *g.*
g. Blades stiff, glabrous above or with a few hairs . 43. *P. tennesseense.*
g. Blades pubescent above, or if glabrous lax *h.*
h. Upper surface of blades with erect hairs 3–5 mm. long.
Culms branching very early; spikelets 1.8–1.9 mm. long . . . . . 46. *P. praecocius.*
Culms branching after maturity of primary panicle; spikelets not over 1.5 mm. long.
Axis of panicle long-pilose . . . . 39. *P. implicatum.*
Axis of panicle nearly glabrous . . . 40. *P. meridionale.*
h. Upper surface of blades with short or somewhat appressed pubescence.
Blades stiff; spikelets obovate . . . . 38. *P. huachucae.*
Blades lax; spikelets elliptical (38) *P. huachucae*, v. *silvicola.*
e. Pubescence not spreading *i.*
i. Culms crisp-puberulent or crisp-pubescent; ligule nearly obsolete.
Spikelets 1.9 mm. long; blades 5–6 cm. long; plants blue-green . . . . . 52. *P. tsugetorum.*
Spikelets 1.7 mm. long; blades 3–5 cm. long; plants gray-green . . . . . 53. *P. columbianum.*
i. Culms with short or long appressed pubescence *j.*
j. Ligule obsolete or nearly so.
Spikelets 2.5 mm. long . . . . . 50. *P. Commonsianum*
Spikelets 2–2.2 mm. long . . . . . 51. *P. Addisonii.*
j. Ligule 2–3 mm. long.
Pubescence on lower sheaths spreading . . 40. *P. meridionale.*
Pubescence on lower sheaths appressed.
Blades glabrous on upper surface; spikelets 1.2 mm. long . . . . . 37. *P. leucothrix.*
Blades pubescent on upper surface; spikelets 1.5–1.9 mm. long.
Spikelets 1.5 mm. long; panicles not over 3 cm. long . . . . . 41. *P. oricola.*
Spikelets 1.9 mm. long; panicles 3–5 cm. long . . . . . 42. *P. subvillosum.*

§ 1. PASPALOÍDEA Nash. *Spikelets acute, glabrous, subsessile in one-sided racemes, these racemose on an elongated axis.*

1. **P. hemítomum** Schultes. Culms thick, 9–12 dm. long, rooting and branching at the lower nodes; sheaths loose, glabrous or hairy on the margins; blades 1–2 dm. long, about 1 cm. wide; panicle 1–2 dm. long, very narrow, the remote racemes appressed, spikelet-bearing to the base; spikelets 2.8 mm. long, lanceolate; fruit less indurated and rigid than in true *Panicum;* palea not inclosed at the apex. (*P. Curtisii* Chapm.; *P. digitarioides* Carpenter.) — Ponds, Del. to Fla. and Tex.

§ 2. EUPÁNICUM Gren. & Godr. *Spikelets disposed in more or less spreading panicles; palea included at the summit.*

* VERRUCÒSA. — *Spikelets tuberculate; branching annuals, rooting at the lower nodes.*

2. **P. verrucòsum** Muhl. *Glabrous;* culms slender, spreading or ascending, 3–6 dm. high; leaves 1–1.5 dm. long, 4–6 mm. wide, shining; panicle diffuse, few-flowered, 0.7–2.5 dm. long (reduced panicles often produced from the base), branches capillary, spreading, spikelet-bearing toward the ends; spikelets 1.5 mm. long, subacute; first glume about one fourth as long as the faintly nerved *warty second glume and sterile lemma;* fruit apiculate. — Moist sandy soil, Mass. to Fla.; also in Ind. at the s. end of L. Michigan. FIG. 58.

58. P. verrucosum. Spikelet × 9.

** CAPILLÀRIA. — *Branching annuals, hispid as a whole; panicles diffuse; spikelets glabrous, strongly nerved; first glume about one half the length of the second, broad, clasping the base of the spikelet, acute; second glume and sterile lemma slightly or greatly exceeding the elliptical smooth and shining fruit.*

3. **P. capillàre** L. (OLD-WITCH GRASS.) *Culms* stout, *sparingly branched,* ascending; sheaths and usually the leaves (5–15 mm. wide) copiously papillose-hispid; *panicle* very large and diffuse, often *half the length of the entire plant,* included at base until maturity; spikelets 2–2.5 mm. long; *second glume and sterile lemma acuminate,* exceeding the fruit. — Sandy soil, and as a weed in fields, N. S. to B. C., and southw. Aug.–Oct. — At maturity lower panicle-branches diverge and the panicles break away and act like tumble weeds. FIG. 59.

59. P. capillare. Spikelets × 4.

4. **P. Gattingèri** Nash. *Culms* widely spreading or decumbent, sometimes as much as 1 m. long, *branching at all the nodes, the branches again branching;* the *numerous exserted panicles oval, smaller and less diffuse* than in the preceding; *spikelets more turgid;* leaves less hirsute. (*P. capillare,* var. *campestre* Gattinger.) — Moist open ground, Me. to N. C., Ill., and Mo. — Depauperate plants forming very small prostrate mats occur in N. E. and N. Y.

5. **P. fléxile** (Gattinger) Scribn. Slender, *erect,* 3–6 dm. high, with a few erect branches at base; *leaves* 1–2.5 *dm. long,* 2–6 mm. wide, rarely wider, sometimes nearly glabrous, erect; *panicles usually one half the length of the entire plant, narrowly oblong with ascending branches; spikelets* 3–3.5 *mm. long, solitary at the ends of the branchlets; the long acuminate second glume and sterile lemma one third longer than the fruit.* — Moist sandy soil, Pa. and Mich., southw.

6. **P. philadélphicum** Bernh. Slender, erect or ascending, usually decumbent at base, freely branching, zigzag, 1.5–4 dm. high; *leaves less than* 1 *dm. long,* 2–6 mm. wide; *panicle about one third the entire height of the plant,* rather few-flowered, *spikelets* in 2's or sometimes solitary, at the ends of the divergent flexuous branchlets, 1.7–1.8 *mm. long; second glume and sterile lemma acute, barely exceeding the fruit.* (*P. minus* Nash, according to description; *P. minimum* Scribn. & Merr.) — Dry woods, clearings, and sandy shores, Me. to I. T., and southw.

7. **P. miliàceum** L. (European Millet.) Culms 2–5 dm. high, erect or decumbent; sheaths papillose-hispid; leaves 1–2.5 dm. long, 2.5 cm. or less wide; *panicle dense, drooping at maturity; spikelets ovoid, 5 mm. long, turgid.* — Waste places, Me. to Pa., westw. to Neb. (Adv. from Eu.)

* * * Dichotomiflòra. — *Branching annual, glabrous throughout.*

60. P. dichotomiflorum. Spikelet × 3.

8. **P. dichotomiflòrum** Michx. Culms compressed, thick, succulent, spreading or ascending from a decumbent base, 3–18 dm. long; leaves 2–4 dm. long, 8–15 mm. wide, scabrous above; panicles 1.2–4 dm. long, diffuse; spikelets short-pediceled, mostly secund toward the ends of the branchlets, 3 mm. long, acute; first glume obtuse, second and sterile lemma pointed beyond the fruit. (*P. proliferum* Am. auth. not Lam.) — Low waste grounds and cultivated fields, Me. to Neb., and southw. July–Oct. — Slender, depauperate, erect or prostrate specimens occur in sterile ground. Fig. 60.

* * * * Virgàta. — *Stout simple mostly glabrous perennials, with long-pediceled spikelets and stout creeping rootstocks.*

9. **P. amàrum** Ell. *Glaucous, caespitose in large bunches,* 5–15 dm. high; *leaves crowded at the base, involute, the uppermost exceeding the contracted panicle, which is* 4–8 *dm. long,* the long slender branches erect; *spikelets* 4.5 *mm. long;* first glume $\frac{1}{2}$–$\frac{2}{3}$ as long as the spikelet, second glume and sterile lemma pointed beyond the grayish fruit. — Sandy seashores, Va., and southw. Aug., Sept. — Foliage bitter.

10. **P. amaroìdes** Scribn. & Merr. *Glaucous; culms* 5–8 dm. high, *scattered from a stout creeping rootstock; leaves* 1–3 *dm. long, flat or somewhat involute; panicle* 1.5–4 *dm. long,* very narrow, the short branches appressed; *spikelets* 6 *mm. long;* first glume $\frac{3}{4}$ as long as the spikelet or more. (*P. amarum*, var. *minor* Vasey & Scribn.) — Sandy seashores, Ct., and southw. Aug., Sept.

11. **P. virgàtum** L. (Switch Grass.) Tufted, from strong creeping rootstocks, 0.9–2 m. high, sometimes glaucous; leaves elongated, flat; *panicles* 1.5–5 *dm. long, nearly as wide,* the branches ascending or spreading, naked at the base; *spikelets* 4–4.5 *mm. long; the second glume and sterile lemma spreading and pointed, exceeding the fruit.* — Low open ground or salt marshes along the coast, also on prairies in the interior, Me. to Man., and southw. — Very variable; leaves sometimes pilose above near the base; marsh plants often very luxuriant, with panicles 6 dm. or more long. Fig. 61.

61. P. virgatum. Spikelets × 3.

Var. **obtùsum** Wood. More slender, 1 *m. high or less;* leaves not over 8 mm. wide; panicle 1.5 dm. long or less, rather narrow; *spikelets* 3 *mm. long; the second glume and sterile lemma blunt and scarcely exceeding the fruit.* (*P. virgatum*, var. *breviramosum* Nash.) — Sand barrens, N. Y., N. J., and southw.

* * * * * Agrostoídia. — *Erect perennials; spikelets lanceolate, pointed, short-pediceled along the elongated main branches of the panicle; fruit narrowly elliptical, exceeded by the second glume and sterile lemma.*

← *Rootstocks absent; plants tufted from a short caudex, compressed at the leafy base, glabrous.*

12. **P. longifòlium** Torr. *Culms slender,* 5–10 dm. high; *leaves* flat or involute toward the ends, the uppermost often equaling the panicle, 3–5 *mm. wide; panicle* purplish, 1–2.5 dm. long, *rather few-flowered;* branches solitary or in 2's, remote, very slender, finally spreading, naked at the base; *spikelets* 2.8–3 *mm. long;* first glume $\frac{1}{2}$ as long as the second which exceeds the sterile lemma. — Moist sandy ground, Ct. to D. C., and southw., mostly coastal. July–Sept.

13. **P. agrostoìdes** Spreng. *Culms* 4–10 dm. high, *rather stout;* sheaths loose; *blades* 2–3.5 cm. long, flat, 0.6–1 *cm. wide;* panicle often purplish, oblong-ovate, 1.5–3 dm. long, *the stiff branches ascending,* naked at the base, *with*

divergent densely flowered branchlets mostly from the lower side; spikelets 2 *mm. long, crowded; a few long hairs on the short pedicel;* second glume and sterile lemma subequal. — Wet meadows and shores, Me. to Minn., and southw. Aug., Sept. FIG. 62.

62. P. agrostoides. Spikelet × 5.

14. **P. stipitàtum** Nash. Similar to the preceding; leaves and panicles commonly dark purple, the latter narrower and closer; lateral panicles short-peduncled from the upper nodes; *spikelets* narrower, more pointed, *distinctly secund upon the branchlets; second glume longer than the sterile lemma; fruit stipitate; no hairs at base of spikelets.* — Moist soil, N. J. to Ky., and southw.

15. **P. condénsum** Nash. Culms stout, 0.8–1.3 m. high, sometimes geniculate below; leaves 2.5–5 dm. long, 8–12 mm. wide, flat or folded; *panicle* 1–3 dm. long, *narrowly oblong, the densely flowered branches erect or narrowly ascending,* the lower ones naked at the base; smaller long-peduncled panicles often produced from the upper nodes; *spikelets* 2.5 *mm. long, rather turgid; second glume and sterile lemma subequal,* the points usually spreading at maturity. — Borders of streams and wet places, Pa. (*Porter*); Alexandria Co., Va.; S. C. and southw.

+ + *Plants from stout scaly rootstocks, not conspicuously compressed at base.*

16. **P. ánceps** Michx. Erect or ascending, 6–12 dm. high; sheaths subcompressed, glabrous or sparsely pilose; blades 1.5–5 dm. long, 6–10 mm. wide, flat; panicles 2–5 dm. long, very loose and open, the slender remote branches spreading; small long-peduncled panicles produced from the upper nodes; spikelets more or less secund, 3.5 mm. long; the *acuminate second glume and sterile lemma curved at the apex, about* $\frac{1}{3}$ *longer than the fruit which bears a minute tuft of hairs at the apex.* (*P. rostratum* Muhl.) — Moist sandy soil, R. I. to Kan., and southw. July–Sept.

* * * * * * DICHÓTOMA. — *Perennials producing simple culms in the spring which later branch more or less profusely, this autumnal state often strikingly different in habit from the spring state; winter rosettes of basal leaves persistent in spring and usually different in shape from culm-leaves; primary panicles produced in spring or early summer seldom perfecting seed, the secondary panicles smaller, often much reduced, the latest included in the sheaths, usually cleistogamous and fruitful; the secondary leaves usually much reduced, often crowded by the dwarfing of the lateral internodes.*

+ 1. *Depauperàta. — Culms tufted, slender, sparingly branching at the base, simple above; leaves long-linear, scabrous above, the basal ones shorter but not forming a distinct flat rosette in the autumn; the reduced secondary panicles, produced from short branches from the lowest nodes, more or less concealed in the leaves at the base; ligule a ring of hairs about* 0.5 *mm. long.*

17. **P. depauperàtum** Muhl. Erect or ascending, 2–4 dm. high; nodes ascending-pubescent; sheaths except the lowest shorter than the internodes, glabrous or pilose; blades 6–15 cm. long, 2–5 mm. wide, often involute in drying; *panicles* not much exceeding the leaves, 4–8 *cm. long,* few-flowered, the rather strict remote *branches ascending; spikelets* 3.2–3.8 *mm. long,* glabrous or sparsely pubescent, strongly nerved; first glume $\frac{1}{3}$–$\frac{1}{2}$ the length of the spikelet, subacute; *second glume and sterile lemma acuminate, extending in a point beyond the fruit which is* 2.3 *mm. long.* — Sterile woods, Me. to Minn., and southw.

18. **P. perlóngum** Nash. Similar to the preceding, more strict in habit, usually papillose-pilose; *blades* averaging longer and narrower (*sometimes* 2.5 *dm. long*), *pubescent on the lower surface; panicles smaller, narrow, the branches nearly erect; spikelets* 2.7–3 *mm. long, oval, blunt,* sparingly pilose, strongly nerved; first glume $\frac{1}{4}$–$\frac{1}{3}$ the length of the spikelet; *second glume and sterile lemma equaling the fruit at maturity, obtuse; fruit* 2.4 *mm. long;* secondary panicles usually more numerous than in the last, sometimes produced from the second node. — Prairies and dry soil, Mich. and S. Dak. to Tex.

19. **P. linearifòlium** Scribn. Densely tufted, 2–4.5 dm. high; *culms very slender, erect, spreading or almost drooping at the summit; sheaths* usually equaling or exceeding the internodes, *sparsely to densely papillose-pilose; blades* 1–3.5 *dm. long*, 2–4 mm. wide, usually exceeding the panicle until maturity, often pubescent below; panicles finally long-exserted, 5–10 cm. long, rather few-flowered, the remote flexuous branches spreading; *spikelets* 2.4–2.7 *mm. long, subacute*, sparsely pilose; first glume ¼–⅓ the length of the spikelet, triangular-ovate; *second glume and sterile lemma equaling the fruit at maturity; fruit* 2 *mm. long.* — Woods, Me. to Md., w. to Mich. and Kan.

20. **P. Wernèri** Scribn. Similar to the preceding; in small tufts, *glabrous except for a few long hairs at the nodes and base of blades; culms strict; leaves firmer*, 1.5 *dm. long or less*, 3–6 mm. wide; *spikelets* 2.2–2.3 *mm. long*, nearly or quite glabrous; *secondary panicles usually wanting.* — Sterile woods and knolls, Me. to Ont., Pa., O., and Mo. — In the field resembles *P. depauperatum.*

+ 2. *Laxiflòra.* — *Plants in soft tufts, light green; culms slender, simple or rarely branching from the lower nodes; basal leaves short, in a dense soft tuft, but not distinctly different from culm-leaves in shape; spikelets obovate, turgid.*

21. **P. xalapénse** HBK. Ascending or spreading, 1–4 dm. high; *culms* lax, *glabrous; nodes bearded; sheaths papillose-pilose with reflexed hairs; blades mostly* 8–12 *cm. long*, 7–11 mm. wide, *sparingly pilose or nearly glabrous except the ciliate margins;* panicle finally exserted, 6–10 cm. long, lax, the *capillary flexuous branches spreading or drooping, few-flowered; spikelets* 2 *mm. long;* first glume glabrous; *second glume and sterile lemma villous*, the glume shorter than the fruit which is 1.5 mm. long and minutely umbonate. (*P. laxiflorum* Am. auth., not Lam.) — Low woods, Md. to Mo., and southw.

22. **P. strigòsum** Muhl. Erect or ascending, 2–4.5 dm. high; *culms pilose;* sheaths and *blades long-pilose, clustered at the base*, 4–8 *cm. long*, 6–9 mm. wide, *upper blades reduced;* panicle finally long-exserted, 4–10 cm. long, the axis pilose, the *capillary branches ascending*, with *numerous* long-pediceled *glabrous spikelets* (1.3–1.5 *mm. long*); second glume and sterile lemma equal, as long as the fruit. — Sandy woods, se. Va. to Tenn., and southw.

+ 3. *Angustifòlia.* — *Mostly grayish-green, caespitose; primary culms with elongated leaves (tapering to each end) and long-exserted few-flowered primary panicles; blades conspicuously striate-nerved; ligule a ring of stiff hairs less than 1 mm. long; autumnal state repeatedly bushy-branched above, often geniculate-decumbent; spikelets obovoid, turgid, attenuate at the base, pubescent (rarely glabrous); first glume 1-nerved; second glume and sterile lemma equal, 7–9-nerved; fruit broadly ellipsoidal.*

23. **P. angustifòlium** Ell. Culms slender, erect or spreading at the top, 3–8 dm. high, appressed-pubescent; *nodes not bearded;* sheaths shorter than the internodes, papillose-pilose, lower commonly purplish; blades ciliate toward the base, 8–15 cm. long, 3–6 mm. wide, somewhat spreading, the lower shorter and often broader; *panicle* 4–9 cm. long, the slender flexuous *branches widely spreading, sometimes drooping*, bearing a few long-pediceled *spikelets about* 2.5 *mm. long;* first glume obtuse, glabrous, ⅓ the length of the spikelet or less; second glume and sterile lemma obtuse, short-villous, equaling the fruit, which is minutely pubescent at the obscurely umbonate apex. *Branching state* leaning, *not prostrate; leaves* reduced, *very narrow*, flat, or involute on the margins only. — Low sandy woods, Del., Va., and southw. — Variable in the amount of pubescence.

24. **P. consanguíneum** Kunth. In the simple state similar to the preceding, but spreading or ascending, more softly and densely villous; *nodes bearded;* the leaves often conspicuously longitudinally wrinkled; *panicles smaller*, the *branches narrowly ascending;* spikelets more turgid, more densely villous. *Branching state decumbent; the numerous leaves soft and flat, rarely over* 5 *cm. long.* (*P. villosum* Ell.) — Low sandy woods, se. Va., and southw.

25. **P. aciculàre** Desv. Ascending-pilose; culms at first ascending or spread-

ing, 3–5 dm. high, very slender; sheaths usually less than half as long as the internodes; blades mostly spreading, flat or involute above, 4–8 cm. long, 4 mm. wide or less, the lower wider; panicle 3–5 cm. long, the flexuous branches spreading; spikelets 2 mm. long; first glume ¼ the length of the spikelet, rounded; second glume and sterile lemma densely pubescent, equaling the fruit which is minutely pubescent at the apex. *In the branching state forming dense prostrate mats, with very numerous crowded short involute-setaceous often falcate leaves.* (*P. filirameum* Ashe; *P. neuranthum* of Britton's Man., not Griseb.) — Sandy soil, mostly near the coast, se. Va., and southw.

26. **P. Bicknéllii** Nash. Culms usually stiff, erect or ascending, 2–4 dm. high (rarely higher); nodes and lower part of the sheaths and margins sparsely hairy; blades 7–14 cm. long, 3–8 mm. wide (rarely wider), ciliate at the base, rather rigid, spreading, flat, the *uppermost usually the longest;* panicles 5–8 cm. long, the stiff slender branches bearing a *few long-pediceled spikelets; these* 2.5 *mm long;* first glume loose, ⅓ the length of the spikelet; second glume and sterile lemma sparsely pilose or rarely glabrous, equaling the fruit or very slightly exceeding it. *Autumnal state ascending or erect,* rather *sparingly branching from the upper nodes with numerous long rather stiff leaves* overtopping the reduced panicles of long-pediceled spikelets. (*P. nemopanthum* Ashe; *P. Bushii* Nash.) — Sterile open woods and hillsides, Ct. to N. C., and Mo.

← 4. *Eudichótoma.* — *Culms solitary or in small tufts, slender, at first simple, with lanceolate leaves and open terminal panicles; later profusely branching, often leaning or decumbent; basal leaves short, forming flat rosettes in the autumn; ligule a ring of hairs less than* 0.5 *mm. long; spikelets elliptical-oblong, not turgid; second glume and sterile lemma* 7*-nerved.*

↔ *Spikelets glabrous.*

27. **P. dichótomum** L. Glabrous, often purplish; culms 3–5 dm. high, erect from short knotted rootstocks; sheaths less than half the length of the internodes, rarely ciliate on the margins; blades spreading, 5–11 cm. long, 4–8 mm. wide; panicle 4–9 cm. long, the flexuous branches spreading, spikelet-bearing toward the ends; spikelets 2 mm. long, rather faintly nerved; *the second glume shorter than the fruit, exposing its summit at maturity. Branching state erect, bushy-branched at the top, like a little tree; the leaves crowded and spreading, more or less involute.* — Woods, Me. to Mich., Fla., and Tex. — Spikelets or lower sheaths rarely minutely pubescent. Fig. 63.

63. P. dichotomum Spikelet × 5.

28. **P. barbulàtum** Michx. In the simple state resembling large specimens of the preceding, in larger tufts; culms sometimes 8 dm. high; *lower nodes often sparsely bearded;* sheaths usually with a puberulent ring at the summit; blades 6–10 cm. long, 6–10 mm. wide; panicles 6–11 cm. long, as wide or wider, *the lower branches drooping at maturity,* spikelet-bearing at the ends; spikelets 2 mm. long; *second glume and sterile lemma equal, covering the fruit at maturity. Autumnal state diffusely branched, forming very large top-heavy reclining bunches, the slender branches recurved.* — Rocky woods and hillsides, Ct. to Mich., Mo., and southw.

29. **P. yadkinénse** Ashe. Similar to *P. dichotomum;* culms taller (sometimes 1 m. high) and stronger; *sheaths usually bearing pale glandular spots;* blades 9–13 cm. long, 8–11 mm. wide; the basal and rameal leaves correspondingly larger than those of *P. dichotomum;* panicle about 10–12 cm. long, the slender branches rather strict; *spikelets* 2.5 *mm. long, acute; second glume and sterile lemma equal, exceeding the fruit, forming a slight beak beyond it. Autumnal state leaning, not profusely branched.* — Moist woods and thickets, Pa. and D. C. to Ga.; and Ill.

30. **P. lùcidum** Ashe. At first resembling *P. dichotomum,* but *bright green, shining,* and with *erect leaves;* the *weak culms soon becoming decumbent,* sometimes rooting at the nodes; sheaths usually ciliate on the margin; blades 4–7 cm. long, spreading in the decumbent state; panicle fewer-flowered; spikelets 2 mm. long; nerves more prominent than in *P. dichotomum: second glume and*

sterile lemma both shorter than the fruit. In late summer the delicate culms are almost creeping and vine-like, repeatedly branching, the *branches elongated and diverging at a wide angle, not fascicled; the waxy flat leaves 2–4 cm. long.* — Wet woods and sphagnum swamps, N. J., D. C., and southw.

31. **P. microcárpon** Muhl. Culms at first erect, in large clumps; *nodes swollen, densely bearded with reflexed hairs;* sheaths less than half as long as the internodes, ciliate on the margin, the lower sometimes pilose; blades 10–12 cm. long, 10–12 mm. wide, thin, spreading or deflexed, ciliate at base, otherwise glabrous; basal leaves shorter and broader; panicles long-exserted, 10–12 cm. long, branches ascending, with numerous *spikelets 1.6 mm. long; second glume slightly longer than the fruit. Becoming diffusely branched, reclining or prostrate, with densely crowded small flat leaves* and numerous very small panicles. (Muhl. in Ell., not Muhl. Gram., which is *P. polyanthes* Schultes; *P. barbulatum* Am. auth., not Michx.) — Wet woods and swampy places, Mass. to Ill., s. to Fla. and Tex. — Spikelets rarely sparsely pubescent.

++ ++ *Spikelets pubescent.*

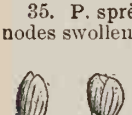
32. **P. boreàle** Nash. Culms 3–5 dm. high, slender, erect, or in weak forms geniculate at base; nodes sometimes with a few hairs; sheaths often overlapping, ciliate on the margin, glabrous, or the lower sparsely pubescent; *blades* 6–12 cm. long, 7–12 mm. wide, *erect, sparingly ciliate toward the rounded base*, otherwise glabrous (rarely puberulent beneath); panicle 5–10 cm. long, hardly as wide, loosely flowered, the slender branches ascending or spreading; spikelets 2.2 mm. long, obtuse; first glume ⅓ as long as the subequal second glume and sterile lemma, which are as long as the fruit. *Sparingly branched from all the nodes in late summer; leaves and panicles not greatly reduced.* — Moist open ground or woods, Nfd. to Ont., s. to N. E., N. Y., n. Ind., and Minn.

33. **P. mattamuskeeténse** Ashe. Often purplish; culms 0.4–1 m. high, erect or geniculate at base, glabrous; nodes puberulent; sheaths loose, short, upper glabrous except on the margin and sometimes the summit, lower usually softly pilose; blades 6–9 cm. long, 6–12 mm. wide (upper and lower smaller), spreading, often reflexed, glabrous; panicle 6–10 cm. long, the *flexuous branches spreading, spikelet-bearing almost to the base; spikelets 2.3 mm. long; second glume and sterile lemma* subequal, *both shorter than the subacute fruit. Remaining erect, branching from the middle nodes in late summer*, the branches rather appressed; *rameal leaves stiffly ascending.* (*P. Clutei* Nash.) — Sandy borders of cranberry bogs and swamps, Mass., N. J., and southw.

34. **P. ánnulum** Ashe. Purplish; culms erect, 5–7 dm. high, in small clumps; nodes densely bearded; sheaths glabrous or the lower softly pubescent; *blades* 6–12 cm. long, 7–13 mm. wide, spreading, *velvety-pubescent on both surfaces*, margins ciliate toward the base; panicles 5–9 dm. long, open; *spikelets 2 mm. long; second glume slightly shorter than the fruit. Erect and sparingly branched from the upper nodes in late summer, soon dying to the ground.* — Dry woods, N. J., Pa., and D. C. to Ga.; apparently rare.

+ 5. *Sprèta.* — *Plants mostly glabrous or at least not spreading-pilose; blades firm; ligule dense, 2–5 mm. long; spikelets densely pubescent, 1.6 mm. long or less.*

35. **P. sprètum** Schultes. Culms erect or slightly decumbent at base, glabrous; nodes swollen, usually naked; sheaths loose, shorter than the internodes, usually ciliate on the margin above, otherwise glabrous, or the lower sparsely pubescent; *ligule 2–3 mm. long;* blades 7–10 cm. long, 4–8 mm. wide, ascending, often reflexed, sparingly long-ciliate at base, otherwise glabrous; *panicle 8–12 cm. long, less than half as wide, rather dense, the fascicled branches ascending or appressed*, short spikelet-bearing branches at the base of the fascicles; *spikelets 1.5–1.6 mm. long, elliptic*, obscurely pointed; *second glume and sterile lemma* equal, *slightly exceeding the fruit.* Somewhat reclining in the autumnal state, *the tufted branches shorter than the elongated primary internodes;* the reduced crowded leaves often conduplicate.



64. P. spretum. Spikelets × 5.

sometimes minutely pubescent on the lower surface. (*P. nitidum* of recent auth., not Lam. *P. Eatoni* Nash; *P. paucipilum* Nash.) — Moist, usually sandy soil, Me., and southw. near the coast; and in Ind. near L. Michigan. FIG. 64.

36. **P. Lindheimèri** Nash. Culms stiffly ascending or spreading, 5–10 dm. long, glabrous or pubescent below; nodes swollen; sheaths less than half as long as the elongated internodes, ciliate on the margin, otherwise glabrous, or the lowermost pubescent; *ligule 4–5 mm. long;* blades 5–8 cm. long, 6–8 mm. wide, ascending, often reflexed when old, with a few hairs on the margins at base, glabrous on both surfaces, or minutely puberulent below; *panicle* 4–7 *cm. long, nearly as wide, branches ascending or spreading, loosely flowered; spikelets* 1.5 mm. long, *obovate, obtuse; second glume shorter than the fruit. Culms elongated and radiating-prostrate in the autumn*, earlier branches long, the later ones in short tufts, all appressed; leaves much reduced, involute-pointed; the hairs at base often conspicuous. — Sandy woods and open ground, Ct. to Fla., w. to Ill. and Cal.

37. **P. leucóthrix** Nash. Light olive green, or often purplish; *culms* 2.5–4.5 *dm. high*, erect, *appressed-papillose*, the hairs on the sheaths more spreading; *ligule* 3 *mm. long; blades* ascending, 2.5–4.5 *cm. long*, 3–7 mm. wide, papillose-ciliate at the rounded base, *velvety beneath;* panicle 3–5 cm long, 2–4 cm. wide, *rather densely flowered*, axis appressed-pubescent, with tufts of long hairs in the axils of the ascending branches; *spikelets* 1.2 *mm. long*, obovate-elliptic, densely papillose-pubescent; second glume and sterile lemma equal, barely covering the obscurely pointed fruit. Branching state erect or nearly so, branches mostly from the lower nodes, not in fascicles; leaves and panicles not greatly reduced. — Low sandy ground, mostly pine land, s. N. J., and southw.

← 6. *Lanuginòsa.* — *Plants pilose at least on culms and sheaths; ligule* 2–5 *mm. long (rarely less); spikelets pubescent.* (*P. pubescens* Am. authors, not Lam.)

38. **P. huachûcae** Ashe. Plants typically stiff, with copious spreading papillose pubescence, harsh to the touch, commonly olivaceous, often purplish; culms 2–6 dm. high, erect or nearly so; nodes bearded with spreading hairs; *blades firm, erect or ascending*, 4–8 *cm. long*, 6–8 *mm. wide, veins inconspicuous, upper surface copiously short-pilose* especially toward the base, lower surface densely pubescent; ligule 3–4 mm. long; panicle 4–6 cm. long, nearly as wide, rather densely flowered, the axis and often the branches pilose; the flexuous fascicled branches ascending or spreading, short spikelet-bearing branchlets at the base of the fascicles; *spikelets* 1.6–1.7 *mm. long*, obovate, obtuse, *turgid;* first glume $\frac{1}{4}$–$\frac{1}{3}$ as long as the spikelet; second glume and sterile lemma papillose-pilose, subequal, slightly shorter than the obscurely apiculate fruit. *Stiffly ascending or spreading in the autumnal state;* culms and sheaths sometimes papillose only, the branches fascicled, the *reduced crowded leaves ascending.* (*P. unciphyllum* of recent Am. auth., not Trin.) — Prairies and open ground, Me. to Minn., and southwestw. — A variable species, apparently intergrading with the following and with *P. implicatum.*

Var. **silvícola** Hitchc. & Chase. Taller and more slender, brighter green, less densely pubescent; *blades thin, lax, and spreading*, 5–10 cm. long, 6–10 mm. wide, upper surface less densely pilose, *lower surface* appressed-pubescent, *with a satiny luster;* panicle 5–8 (rarely 10) cm. long, the branches more spreading *spikelets* the same length but *elliptical and less turgid, with shorter pubescence.* More or less decumbent in the autumnal state, the numerous fascicled branches shorter than the primary internodes, at least late in the season, the reduced *spreading leaves* sometimes nearly glabrous above except for a few long hairs near the base. (*P. lanuginosum* as described by Scribner & Merrill, not Ell.) — Woods and clearings, range of the typical form, but more common southw.

39. **P. implicàtum** Scribn. Erect, 2–5.5 dm. high; slender culms and sheaths papillose-pilose; *ligule* 4–5 *mm. long; blades* 3–6 cm. long, 3–6 mm. wide, rather firm, erect or ascending; *upper surface pilose with erect hairs* 3–4 *mm. long;* lower surface appressed-pubescent; *panicle* 3–5 cm. long, nearly as wide,

the *axis long-pilose*, *the very flexuous branches often tangled*, *the lower usually drooping; spikelets* 1.5 *mm. long*, obovate, obtuse, *papillose-pilose;* second glume and sterile lemma equal, as long as the fruit. In late summer ascending or spreading with fascicled branches from the lower nodes, the crowded reduced leaves pilose as in the simple state. — Wet meadows, bogs, and wooded swamps, N. B. to Minn., s. to D. C.

40. **P. meridionàle** Ashe. Differs from the preceding as follows: more slender, not over 4 dm. high; *upper internodes and sheaths minutely appressed-pubescent only;* panicles not over 4 cm. long, *axis nearly glabrous;* branches ascending or spreading; *spikelets* 1.3–1.4 *mm. long.* The slender culms becoming geniculate-decumbent, with slender fascicled branches at all the nodes; leaves not greatly reduced. (*P. filiculme* Ashe, not Hack.) — Sandy or sterile woods or clearings, Ct. to Ind., N. C., and Ga.

41. **P. orícola** Hitchc. & Chase. Grayish or purplish, densely tufted, *spreading, early branching and prostrate, forming dense mats; culms* 1–3 *dm. long, appressed- or ascending-pilose*, the hairs on the nodes spreading; *sheaths* rather loose, *appressed-pilose; ligule* 1–1.5 *mm. long; blades* 2–5 cm. long, 2–4 mm. wide, firm, *erect or ascending; upper surface covered with hairs* 3–5 *mm. long*, becoming sparse on the later leaves; lower surface appressed-pubescent, a few long hairs intermixed; *panicles* short-exserted, 1.8–3 *cm. long*, 1–2 *cm. wide; spikelets* 1.5 mm. long, *rounded-obovoid, very turgid*, pubescent with short spreading hairs; *first glume abruptly pointed*, $\frac{1}{3}$–$\frac{1}{2}$ *as long as the equal second glume and sterile lemma*, which are barely as long as the fruit. Leaves and panicles not greatly reduced in the branching state. — Sands along the coast, Mass. to Va. — Most readily distinguished by *prostrate and early branching habit*, and small panicles of rounded spikelets, large in proportion to the panicle.

42. **P. subvillòsum** Ashe. Slender, 1–3.5 dm. high, *leafy at the base, widely spreading;* culms and sheaths sparsely ascending-pilose; nodes short-bearded, a glabrous ring below; *ligule* 1 *mm. long, with a ring of hairs* 3–4 *mm. long above it; blades firm*, ascending, 4–6 cm. long, 4–6 mm. wide; *both surfaces pilose, the hairs on the upper* 3–5 *mm. long; panicle long-exserted*, 3–5 cm. long, rather narrow, the *lower branches ascending or appressed*, rather densely flowered, axis pubescent or pilose; *spikelets* 1.9 *mm. long*, obtuse, *turgid;* first glume about $\frac{1}{2}$ as long as the spikelet, acuminate; second glume and sterile lemma subequal, the glume slightly shorter than the fruit. Widely spreading and *branched from the lower nodes* in autumn; leaves and panicles not greatly reduced; leaves less pilose than the earlier ones. (*P. unciphyllum*, forma *pilosum* Scribn. & Merr., not *P. pilosum* Sw.) — Dry woods and sandy ground, Me. to Minn.; and in n. Ind.

43. **P. tennesseénse** Ashe. *Bright green*, often purplish; *culms* 2.5–6 dm. high, slender, *stiffly spreading;* internodes and sheaths papillose-pilose with spreading hairs, or the upper sometimes nearly glabrous; *blades firm*, ascending or suberect, 6–9 cm. long, 5–8 mm. wide (upper much smaller), *with a thin white cartilaginous margin*, often sparsely ciliate at base; *veins conspicuous; upper surface glabrous* or with a few long hairs at the base, appressed-pubescent or nearly glabrous beneath; *ligule dense*, 4–5 *mm. long;* panicle purplish, 4–7 cm. long, nearly as wide, rather densely flowered, the *lower branches ascending; spikelets* 1.6–1.7 mm. long, obtuse, *turgid;* first glume about $\frac{1}{4}$ as long as the spikelet, glabrous; second glume shorter than the fruit at maturity. *Autumnal state widely spreading or decumbent and with numerous fascicled branches as long as or longer than the primary internodes;* leaves much reduced, usually ciliate at base. — Open rather moist ground and wood-borders, Me. to Mich., s. to N. C. and Tex.

44. **P. lanuginòsum** Ell. Grayish olive-green, velvety-villous all over; culms 4–6 dm. high, slender, spreading; leaves 5–10 cm. long (uppermost much smaller), thickish but not stiff, margins sometimes papillose-ciliate, long soft hairs intermixed with the velvety pubescence on the upper surface; *ligule* 3–4 *mm. long; panicle* 5–11 *cm. long*, about as wide, loosely flowered, the filiform branches finally wide-spreading; spikelets 1.8 mm. long, obovate-elliptic, obtuse, villous with soft spreading hairs; first glume $\frac{1}{3}$ as long as the spikelet; second glume and sterile lemma equal, slightly shorter than the subacute fruit. *Decumbent and*

repeatedly branching in the autumn, branches much exceeding the internodes, leaves much reduced, usually ciliate. — Moist sandy woods, mostly near the coast, N. J. to Fla. and La. — Resembling *P. scoparium* in color and pubescence, but smaller and much more slender.

45. **P. aubúrne** Ashe. Similar to the preceding but smaller in all its parts, *early becoming diffusely branched and decumbent; upper surface of the blades with copious long silky hairs intermixed with the velvety pubescence;* primary *panicle* short-exserted, 3–4 *cm. long.* about as wide, *axis velvety with long silky hairs intermixed*, branches spreading; *spikelets* 1.3–1.4 *mm. long*, obovate, *very turgid*, densely papillose-pubescent; first glume $\frac{1}{3}$–$\frac{1}{2}$ as long as the spikelet, second glume and sterile lemma equal, covering the fruit. — Sandy pine and oak woods on the coastal plain, N. J. to Fla.

46. **P. praecòcius** Hitchc. & Chase. *Culms* very slender, wiry, *early branching*, 1.5–4 dm. high, *soon becoming geniculate and somewhat spreading, copiously pilose with weak spreading hairs* 3–4 *mm. long, as are the sheaths*, which are much shorter than the long internodes; *ligule* 3–4 *mm. long; blades rather firm*, 5–8 cm. long, 4–6 mm. wide, those of the branches as large as the primary blades, often involute toward the end, *long-pilose on both sides; the hairs on the upper surface erect*, 4–5 *mm. long;* primary panicle 4–6 cm. long, nearly as wide, loosely flowered, axis pilose, branches spreading or ascending; *secondary panicles* numerous, *appearing before the maturity of the primary one; spikelets* 1.8–1.9 *mm. long*, obovate, turgid, long-pilose with weak spreading hairs; first glume $\frac{1}{3}$–$\frac{1}{2}$ as long as the spikelet; second glume and sterile lemma subequal, the glume slightly shorter than the fruit. — Dry prairies and clearings, Mich. and Ill. to Okla. and Tex. — Scarcely has a simple state, branches appearing often before the primary panicle is expanded.

47. **P. scoparioìdes** Ashe. *Culms* erect, *papillose-hispid*, a glabrous or papillose ring below the *bearded nodes;* lower sheaths distant, the upper sometimes overlapping on the shortened internodes, papillose-hispid (rarely nearly glabrous); ligule 2–3 mm. long; *blades firm*, ascending or spreading, 7–10 cm. long, 6–7 mm. wide, *papillose-pubescent beneath, sparsely hispid above;* panicle pale, rather densely flowered, sometimes included at the base, 4–7 cm. long, about $\frac{2}{3}$ as wide; branches ascending or spreading; spikelets 2.2–2.3 mm. long, obovate, obtuse, papillose-pubescent, strongly nerved; first glume about $\frac{1}{4}$ as long as the spikelet, second barely as long as the fruit. *Autumnal state with short branches at the middle and upper nodes*, the reduced blades involute-pointed, much exceeding the panicles. — Dry gravelly or serpentine soil, Ct. to Del.; apparently rare.

48. **P. villosíssimum** Nash. Olive-green; *culms* 2.5–4.5 dm. high, erect or ascending, slender, *villous with spreading hairs* 3 *mm. long, as are the sheaths; ligule* 4–5 *mm. long; blades* rather firm, especially those of the branches, ascending, 6–10 cm. long, 5–10 *mm. wide*, often subinvolute toward the end, pilose on both surfaces, *hairs of the upper surface appressed, long and less copious;* primary panicles often equaled by the uppermost leaf, 4–8 cm. long, about as wide, loosely flowered; *spikelets* 2.2–2.5 *mm. long*, oblong-elliptic, obtuse, *papillose-pubescent;* first glume $\frac{1}{3}$–$\frac{1}{2}$ as long as the subequal second glume and sterile lemma which are scarcely as long as the subacute fruit. Culms in autumnal state widely spreading, often with geniculate nodes and arched internodes; late in the season *prostrate, leaves of the fascicled branches appressed, the clump having a flat combed-out appearance*, a character conspicuous in the field but less so in the herbarium; blades not much reduced. (*P. atlanticum* Nash; *P. haemacarpon* Ashe; *P. xanthospermum* Scribn. & Mohr.) — Sandy or sterile soil, open woods and hillsides, Mass. to Minn., s. to Fla.; common.

49. **P. ovàle** Ell. Light olive-green; *culms* 2–4 dm. high, erect or ascending, rather stout, *villous with ascending or appressed long silky hairs; nodes densely bearded with spreading hairs;* sheaths nearly as long as the internodes, the *upper sometimes overlapping*, villous like the culm, or upper rarely nearly glabrous; *ligule* 2 *mm. long; blades* 6–10 cm. long, 5–9 mm. wide, *firm, ascending, rounded at base*, more or less *appressed-pilose toward the margins and base above*, appressed-pubescent below; panicle usually short-exserted, 5–8 cm. long,

3–6 cm. wide, rather loosely flowered, branches somewhat contracted after flowering; *spikelets* 2.7–2.9 *mm. long*, oblong-elliptic, obtuse, villous with silky hairs; first glume 3-nerved, $\frac{1}{3}$–$\frac{1}{2}$ as long as the equal second glume and sterile emma which barely cover the obtuse fruit. In late summer the *stiff ascending or erect culms bear numerous short crowded branches with firm sometimes nearly glabrous blades*, but little reduced. (*P. ovale* Ell. as to specimen so labeled in Elliott herbarium and of description in part. The author confused a puberulent narrow-leaved *P. commutatum* with this species, and his description is made to cover both. Not *P. ovale* of Small's Fl.) — Dry sand, N. J. to Fla.; and about L. Mich. in Mich. and Ind.

+ 7. *Columbiàna.* — *Culms rather stiff, appressed-pubescent at least below; blades firm, thick, ascending, cartilaginous-margined, appressed-puberulent on lower surface, usually glabrous on upper surface; sheaths appressed-pubescent; ligule less than* 1 *mm., usually about* 0.5 *mm. long; spikelets obovate, turgid, pubescent; the first glume* $\frac{1}{3}$–$\frac{1}{2}$ *as long as spikelet. Habitat, sandy soil.*

50. P. Commonsiànum Ashe. In large tufts; *culms* ascending or spreading, *densely appressed-pilose*, as are the sheaths; blades flat, 6–10 cm. long, 5–6 mm. wide (the upper and lower smaller), at least the lower appressed-pilose beneath; panicle 4–8 cm. long, about as broad, the branches spreading, usually with few *spikelets* (2.5–2.7 *mm. long*); *the first glume rather remote,* $\frac{1}{2}$ *as long as the spikelet, narrow, acute;* second glume and sterile lemma equaling the fruit. *Branching state* often purple, *widely and stiffly spreading, flat on the sand, with short-fascicled branches mostly from the upper nodes*, and crowded stiff subinvolute leaves. — Dunes and sandy woods, mostly near the coast, Ct.; s. N. J. and southw.

51. P. Addisònii Nash. Often purplish; *culms* stout, rigid, 2–4 dm. high, *erect or ascending, densely long-appressed-pubescent*, the pubescence on the sheaths shorter; blades 5–7 cm. long, 4–6 mm. wide, glabrous above (or a few hairs near the margin); panicle 3–5 cm. long, 2–3 cm. wide, rather densely flowered, branches ascending; *spikelets* 2–2.2 *mm. long; first glume about half as long as the spikelet;* second glume and sterile lemma barely equaling the fruit. In late summer *ascending or spreading, with short appressed branches from the middle and upper nodes*, the reduced blades involute toward the summit. — Sand barrens, Ct. to N. C.

52 P. tsugetòrum Nash. Bluish green, sometimes purplish; *culms slender*, 2.5–5 cm. high, ascending or spreading, often geniculate below, *crisp-appressed-pubescent*, as are the sheaths; *blades* 5–6 *cm. long* (rarely longer), 4–7 mm. wide, glabrous above or with a few long hairs near the base and margins; panicle 3–5 cm. long, about as wide, rather loosely flowered, branches ascending or spreading; *spikelets* 1.9 *mm. long; first glume about* $\frac{1}{3}$ *as long as the spikelet;* second glume and sterile lemma equaling the fruit. More or less spreading in autumnal state, freely branching from middle nodes, branches ascending; leaves not greatly reduced, scarcely involute. — Sandy woods, N. Y. and N. J.; also about the Great Lakes. — Some forms hardly distinguishable from the next.

53. P. columbiànum Scribn. Culms rather slender, erect or ascending, 2–4 dm. high, *ascending-crisp-pubescent*, as are the sheaths; *blades* 5 *cm. long or less*, 4–5 mm. wide, mostly glabrous above; panicles finally long-exserted, 3–5 cm. long, somewhat narrower, branches ascending or spreading; *spikelets* 1.7 *mm. long; first glume* $\frac{1}{3}$–$\frac{1}{2}$ *as long as the spikelet;* second glume and sterile lemma equaling the fruit. *Widely spreading but not decumbent in the autumnal state*, repeatedly branching from the middle nodes, *the branches erect; the reduced leaves involute-pointed, glabrous above.* (*P. psammophilum* Nash.) — Dry sandy soil, N. E. to Ala., mostly near the coast.

Var. thínium Hitchc. & Chase. Like small specimens of the species in the simple state, but *branching earlier and more profusely, decumbent, forming dense mats; the small leaves* (1–2 *cm. long*) *with scattered long hairs on the upper surface;* spikelets 1.3–1.4 mm. long. — With the species, dry sands, N. J. and Del.

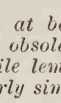
← 8. *Ensifòlia.* — *Delicate, densely tufted, mostly glabrous; spikelets not over 1.5 mm. long; ligule obsolete.*

54. **P. ensifòlium** Baldw. Culms 2–3.5 dm. high, glabrous, ascending or spreading, *from dense tufts of ascending basal leaves; these 3–7 cm. long, 4–5 mm. wide, remaining green throughout the summer;* sheaths glabrous, much shorter than the long internodes; *culm-blades 0.7–2 cm. long, 1–2 mm. wide, spreading,* usually puberulent beneath; panicle 1.5–3 cm. long, nearly as wide, rather few-flowered; *spikelets* 1.5 mm. long, obovate-elliptic, turgid at maturity, *densely puberulent;* second glume slightly shorter than the obtuse fruit. Branching from the upper nodes in the autumnal state, culms usually decumbent, branches short, not very numerous. (*P. Brittoni* Nash.) — Borders of cranberry bogs, N. J., and low pine lands southw.

P. TÉNUE Muhl. (*P. unciphyllum* Trin.; *P. albo-marginatum* Nash) has been collected in the Great Dismal Swamp, Va. (*Chase*). This is characterized by the larger and firmer leaves clustered at the base of the culms and having, especially when dry, conspicuous cartilaginous white margins.

← 9. *Sphaerocárpa.* — *Rather stout, glabrous; blades firm, cordate at base, scabrous on upper surface, margins cartilaginous; ligule nearly obsolete; spikelets obovoid-spherical, puberulent; second glume and sterile lemma 7-nerved, equaling fruit at maturity. Sparingly branched or nearly simple in autumn.*

55. **P. sphaerocárpon** Ell. Dull green; *culms* 2–5.5 dm. high, *usually widely spreading, nodes appressed-pubescent;* sheaths nearly as long as the internodes or overlapping, loose toward the summit, ciliate on the margin; *blades* 6–10 *cm. long,* 7–14 *mm. wide* (uppermost smaller), thick, ascending, stiff-ciliate toward the base, *nerves inconspicuous; panicle* long-exserted, 5–10 *cm. long, nearly as wide,* rather loosely flowered, *with viscid spots on the axis and ascending branches;* spikelets usually purple, 1.6–1.8 mm. long; fruit china-white. Sparingly branching from the lower nodes late in the season; leaves and panicles not much reduced. — Sandy ground, Mass. to Kan., and southw. FIG. 65.



65. P. sphaerocarpon. Spikelet × 1.

56. **P. polyánthes** Schultes. Light green, *erect;* culms 3–9 dm. high, *nodes glabrous;* sheaths very long, usually overlapping, margin finely ciliate; *blades* 12–23 *cm. long,* 1.5–2.5 *cm. wide* (uppermost not smaller), *strongly nerved,* ciliate toward the base; *panicle* 8–25 *cm. long, not more than half as wide,* densely flowered, *lower branches nearly erect, often distant;* spikelets green, 1.5–1.6 mm. long; fruit stramineous. Culms simple or very sparingly branched from the lower or middle nodes late in the season. (*P. microcarpon* Muhl. Gram., not Ell.) — Damp ground, woods and openings, N. Y. to I. T., and southw.

← 10. *Commutàta.* — *Stout, erect, glabrous or puberulent only; leaves cordate, over 1 cm. wide (sometimes less in P. Ashei); ligule nearly obsolete; panicles open, loosely flowered; spikelets oblong or elliptic, not turgid, pubescent, 2.6–3 mm. long; second glume and sterile lemma strongly 7-nerved.*

57. **P. commutàtum** Schultes. In large or small clumps; *culms* 4–7.5 dm. high, usually stiff, erect and *glabrous,* nodes puberulent; *sheaths glabrous* or puberulent toward the summit, a pubescent ring at the junction with the blade, margin ciliate; *blades* rather firm, spreading or ascending, 5–12 *cm. long,* 1.2–2 *cm. wide* (rarely longer or wider), glabrous on both surfaces (rarely puberulent), margins ciliate toward the base; panicle 6–11 cm. long, as wide or wider; spikelets 2.6–2.8 mm. long, oblong-elliptic, obtuse; second glume and sterile lemma equal, barely covering the minutely umbonate fruit. In autumnal state *culms* ascending or spreading, *with somewhat divaricate simple branches from the middle nodes;* the leaves crowded but hardly reduced. (*P. subsimplex* Ashe.) — Woods and copses, Del. to Fla., w. to Ill. and Tex.

58. **P. Áshei** Pearson. Usually purplish, *in loose clumps from a knotted crown; culms* 2.5–5 dm. high, erect, stiff, wiry, *densely crisp-puberulent:* sheaths

less densely puberulent, short-ciliate on the margin; *blades* often approximate toward the summit, 5–8 *cm. long*, 5–12 *mm. wide*, *rigid*, spreading or ascending, ciliate at the subcordate base, otherwise glabrous; panicle 5–10 cm. long, hardly as wide; spikelets 2.6 mm. long, oblong-elliptic, obtuse; second glume and sterile lemma subequal, obtuse or withering to a point, slightly exposing the minutely umbonate fruit. In *autumnal state the culms bearing widely divergent branches* from all or sometimes from only the upper nodes; the *crowded leaves rigid, widely spreading;* plants often top-heavy and reclining from repeated branching; leaves little reduced except those of late autumn. — Dry, especially rocky, woods, Mass. to Ga., w. to Mich. and Mo.

59. **P. mutábile** Scribn. & Smith. *Blue green, almost glaucous,* erect, rather slender, 5–8 dm. high, solitary or few in a tuft; culms glabrous or crisp-puberulent below; sheaths ciliate, otherwise glabrous; *blades* 8–12 *cm. long*, 1–1.6 *cm. wide*, *horizontally spreading*, *conspicuously ciliate*, *especially the wider basal ones*, otherwise glabrous; panicles 8–10 cm. long, about as wide; *spikelets* purple, 3 *mm. long*, elliptical; first glume $\frac{1}{3}$–$\frac{1}{2}$ as long as the spikelet, the second barely as long as the fruit. *Internodes much elongated in the autumnal state*, culms somewhat spreading, early branches elongated, later ones short and somewhat crowded. — Sandy soil, mostly in shade, se. Va. to N. C. and Miss.

← 11. *Lanceària. — Densely tufted; olive-green; culms slender, wiry, puberulent; blades short, flat, firm, the thin cartilaginous margins papillose-ciliate toward the base; ligule obsolete or nearly so; spikelets pyriform, turgid, strongly nerved.*

60. **P. lanceàrium** Trin. *Culms erect or geniculate at base*, often reddish, 1.5–4 dm. high, crisp-puberulent as are the short sheaths; blades ascending or spreading, 2.5–4.5 cm. long, 3–5 mm. wide, usually ciliate for $\frac{1}{3}$–$\frac{1}{2}$ their length, puberulent beneath, glabrous above; panicles short-exserted, loosely flowered, 3–5 cm. long, $\frac{2}{3}$–$\frac{3}{4}$ as wide, the few very flexuous branches spreading or drooping, spikelet-bearing from the base; *spikelets* 2 mm. long, 1 *mm. wide;* first glume about $\frac{1}{3}$ as long as the *glabrous or puberulent subequal second glume and sterile lemma*, the glume scarcely covering the fruit, which is obscurely pubescent at the apex. Autumnal state decumbent, ascending at the ends, with *short fascicled branches from the upper nodes;* the densely crowded leaves reduced, involute-pointed. (*P. Nashianum* Scribn.) — Low pine lands near the coast, se. Va. to Miss.

61. **P. pátulum** (Scribn. & Merr.) Hitchc. *Culms lax, prostrate*, 2–6 dm. long; *sheaths and both surfaces of the blades softly pubescent;* the blades thin, spreading, 4.5–8 cm. long, 5–8 mm. wide, often ciliate nearly to the apex; panicles 4.5–7 cm. long, hardly as wide, the slender branches spreading, spikelet-bearing from near the base; *spikelets* 2 mm. long, 1.3 *mm. wide;* first glume about $\frac{1}{2}$ as long as the *densely papillose-pubescent second glume and sterile lemma*, the glume scarcely covering the fruit, which is obscurely pubescent at the apex. *Autumnal state widely spreading, almost vine-like, the numerous branches slender and elongated;* leaves and panicles not greatly reduced. (*P. Nashianum*, var. Scribn. & Merr.) — Moist sandy soil, se. Va. to Fla., near the coast.

← 12. *Oligosánthia. — Culms stout, erect; blades firm, rarely over* 1.5 *cm. wide, usually narrower; ligule from nearly obsolete to* 3 *mm. long; spikelets obovate, turgid, usually papillose-hispid*, 3–4 *mm. long.*

62. **P. oligosánthes** Schultes. In small tufts; *culms* 3–8 dm. high, often purplish, *appressed-pubescent below; sheaths* rather loose, *ascending-papillose-pubescent; ligule* 1–2 *mm. long, with long hairs intermixed;* blades stiffly spreading or ascending, 6–10 cm. long, 5–8 (rarely 10) mm. wide, sharply acuminate, glabrous on the upper, harshly puberulent on the lower surface; panicles 6–10 cm. long, nearly as wide, loosely flowered, branches ascending; spikelets 3.5–4 mm. long, *narrowly obovate, subacute*, sparsely pubescent; first glume less than $\frac{1}{2}$ the length of the second glume, which is shorter than the fruit. In the autumnal state somewhat spreading, branching sparingly from the lower nodes, and

profusely from the upper, the *short branches aggregated at the summit; the crowded leaves widely spreading.* (*P. pauciflorum* Ell., not R. Br.) — Sandy soil, Del. to D. C., and southw.; and in n. Ind., near L. Michigan.

63. **P. Scribneriànum** Nash. Similar to the preceding, usually in larger clumps; culms not so tall, usually less pubescent; *sheaths papillose-hispid* or sometimes nearly glabrous; ligule about 1 mm. long; blades ascending or erect, averaging wider (6–10 mm., rarely wider), usually ciliate toward the subcordate base; panicle short-exserted, 4–7 rarely 9 cm. long, about as wide; *spikelets* 3.2–3.3 *mm. long, very turgid, obtuse*, sparsely pubescent or nearly glabrous; second glume slightly shorter than the minutely apiculate fruit. Branching late, mostly from the lower nodes, forming short tufts. (*P. scoparium* Wats. & Coult., not Lam.) — Sandy soil or dry prairies, Me. to Ont., and westw. to the Pacific, s. to Va. and Tex. Fig. 66.

66. P. Scribnerianum. Spikelet × 4½.

64. **P. Leibérgii** (Vasey) Scribn. *Culms* 3–8 dm. high, *scabrous, at least below the nodes; sheaths strongly papillose-hispid, with spreading hairs;* ligule very minute; *blades* ascending, 8–15 cm. long, 8–12 mm. wide, *papillose-hispid on both surfaces*, often sparsely so above; *panicle* 8–15 *cm. long, less than* ½ *as wide*, the *branches narrowly ascending; spikelets* 4 *mm. long*, less turgid than in the last, papillose-hispid with long spreading hairs; first glume over ½ as long as the spikelet, acuminate, second equaling the fruit. Sparingly branched from the lower nodes in late summer, the branches mostly simple, erect; blades not much reduced. — Prairies, O. and Mich. to S. Dak. and Mo.

65. **P. Ravenèlii** Scribn. & Merr. Erect or ascending; culms 3–6 dm. high, *densely papillose-pubescent with ascending hairs; nodes short-bearded;* sheaths distant below, the upper overlapping, pubescent like the culm; *ligule* 3–4 *mm. long; blades thick*, ascending, 8–15 cm. long, 1–1.5 *mm. wide*, rarely wider, *ciliate nearly to the apex, densely pubescent beneath, glabrous above;* panicle short-exserted or included at base, 7–10 cm. long, about as wide, branches finally spreading; *spikelets* 4 *mm. long, broadly obovate, very turgid*, sparsely pubescent; first glume about ⅓ as long as the spikelet, second glume slightly shorter than the fruit. Autumnal state more or less spreading, bushy-branched above; the crowded leaves ascending. — Sandy or gravelly soil, Md. and D. C., southw.

66. **P. xanthophysum** Gray. Yellowish green; *culms* ascending, in small tufts, 2–6 dm. high, *scabrous;* sheaths loose, at least the lower overlapping, sparsely papillose-pilose, bearded at the summit; ligule minute; *blades erect or nearly so, rather thin, strongly nerved*, 1–1.5 *dm. long*, 1–1.8 *cm. wide*, narrowed to the rounded *ciliate base, otherwise glabrous; panicle* finally long-exserted, 0.5–1.2 *dm. long, very narrow, few-flowered, the branches erect; spikelets* 4 *mm. long*, broadly obovate, very turgid, pubescent, rarely glabrous; *first glume nearly* ½ *as long as the spikelet, pointed*, second scarcely covering the fruit. Branching in midsummer from the second and third nodes, branches erect, mostly simple; the large erect leaves making the plant appear very leafy in the middle. — Dry soil, Me. to Man., and Pa.

67. **P. Wilcoxiànum** Vasey. *Culms* erect, 1–2 *dm. high, copiously papillose-pilose* as are the usually overlapping sheaths (rarely nearly glabrous); ligule about 1 mm. long; *blades* erect, 5–6.5 cm. long, 3–5 mm. wide, *densely long-pilose on both surfaces; panicle* finally exserted, 2–4 *cm. long, about half as wide*, rather densely flowered, branches ascending; *spikelets* 2.7–3 *mm. long*, oblong-obovate, pubescent; first glume about ⅓ as long as the spikelet, second hardly covering the fruit. Autumnal state branching from all the nodes, forming bushy tufts with rigid erect leaves much overtopping the reduced panicles. — Prairies, Ia. to S. Dak. and Kan.

← 13. *Scopària. — Culms tall and stout, finally wide-spreading; blades flat, elongated, not over* 1.5 *cm. wide; ligule short; spikelets abruptly pointed, strongly* 7–9-*nerved.*

68. **P. scopàrium** Lam. Grayish olive-green, *velvety-pubescent all over except as noted;* culms 8–13 dm. high, erect or ascending, often geniculate at base,

nodes bearded with reflexed hairs, a glabrous viscid ring below; sheaths about ½ as long as the internodes, the *velvety pubescence wanting on the back toward the summit, the naked surface viscid when fresh;* ligule 1 mm. long; blades rather thick, spreading, often reflexed in age, 1.2–2 dm. long, 1–1.5 cm. wide, uppermost reduced; *panicle* 1–1.5 *dm. long, nearly as wide,* many-flowered; *axis, branches and pedicels with viscid blotches;* branches spreading or ascending, spikelet-bearing to the base; *spikelets* 2.6 *mm. long, obovate, turgid, papillose-pubescent;* second glume shorter than the apiculate fruit. Culms leaning or spreading in the autumnal state, repeatedly branching from the middle nodes, the fascicles of branches usually fan-shaped and shorter than the very long internodes, or elongated and scorpioid; sheaths swollen above, constricted at the throat. — Wet ground, N. J. to I. T., and southw.

69. **P. scabriúsculum** Ell. *Culms* 1–2 m. high, *roughened at least below the nodes,* often puberulent; sheaths loose, constricted and bearded at the throat, densely papillose-hispid to nearly glabrous, often spotted; ligule minute, membranaceous, usually a ring of hairs above it; *blades* stiffly ascending or spreading, often reflexed, 1.5–2.5 *dm. long,* 9–12 (rarely 15) mm. wide, *usually harsh-pubescent beneath and glabrous above; panicle* 1.2–2.5 *dm. long, about* ⅔ *as wide, rather densely flowered, the lower branches ascending, axis, branches and pedicels prominently viscid-spotted,* branches spikelet-bearing to the base; *spikelets* 2.4 *mm. long, ovate, acuminate, minutely puberulent;* first glume ⅙–⅕ as long as the spikelet, *second glume and sterile lemma exceeding the fruit.* Autumnal state leaning or widely spreading, repeatedly branching from the middle nodes; branches erect, later ones short; the crowded reduced blades often harsh-pubescent on both surfaces. — Swamps, W. Va., Va., and southw.

70. **P. aculeàtum** Hitchc. & Chase. Resembles the preceding; *culms* slender, in very large clumps, *scabrous, harsh-pubescent below; sheaths* not so loose as in the last, *papillose-hispid with stiff sharp-pointed hairs,* uppermost usually glabrous; ligule minute, membranaceous, ciliate; *blades* stiffly ascending or spreading, 1.2–2 dm. long, 9–15 mm. wide, *very scabrous on the upper surface and toward the apex beneath;* panicle 8–12 cm. long, about as wide, few-flowered, *axis and branches not viscid or with a few spots only, lower branches spreading; spikelets* 3 *mm. long, elliptical, minutely pubescent;* first glume ¼–⅓ as long as the spikelet, second glume and sterile lemma slightly exceeding the fruit. Autumnal state somewhat spreading, branched from the middle nodes, the branches divaricate, not much crowded. — Swampy woods, D. C. and N. C.; apparently rare.

← 14. *Latifòlia. Culms erect, stout; blades* 2 *cm. or more wide, cordate-clasping at base, strongly nerved, acuminate; ligule minute; panicle open; spikelets* 3–4 *mm. long, pubescent, strongly nerved.*

71. **P. clandestìnum** L. Usually in very large clumps, 5–12 dm. high; *culms, nodes and sheaths strongly papillose-hispid,* or the upper nearly glabrous; blades ascending, 1–2 dm. long, 1.8–2.5 cm. wide, scabrous toward the ends; panicle exerted, 1–1.5 dm. long, about as wide, rather densely flowered, the fascicled branches ascending; *spikelets* 3 *mm. long,* elliptic, second glume shorter than the subacute fruit. Autumnal state with appressed branches with shortened internodes, the overlapping sheaths usually more strongly papillose-hispid than the earlier ones, the later branchlets very short, the leaves crowded at the summit, the panicles entirely inclosed in the sheaths. (*P. decoloratum* Nash.) — Moist ground, Me. to Minn., and southw. Fig. 67.

67. P. clandestinum. Closed and open spikelet × 3.

72. **P. Bóscii** Poir. *Culms* 3–7 dm. high, *minutely pubescent or glabrous,* at least the lower *nodes bearded with reflexed hairs;* sheaths puberulent, a dense ring of pubescence at the summit; blades 8–12 cm. long, 2.5–3 mm. wide, rarely wider, pubescent beneath, sparsely so (rarely glabrous) above, short-ciliate on the margins toward the base; panicle 6–10 cm. long, usually nearly as wide, the lower branches spreading or ascending; *spikelets* 4–4.5 *mm. long,* obovate; first glume ⅓–½ as long as the spikelet, second glume

and sterile lemma scarcely equaling the fruit which is minutely pubescent at the apiculate tip. More or less spreading in the autumnal state, branching from the middle nodes, the upper leaves of the branches crowded and spreading. (*P. latifolium* Am. auth., not L.) — Woods, Me. to Minn., and southw.

Var. **mólle** (Vasey) Hitchc. & Chase. Usually not so tall, *downy-pubescent throughout.* (*P. latifolium*, var. Vasey; *P. pubifolium* Nash.) — Commoner southw.

73. **P. latifòlium** L. Like *P. Boscii*, but *usually taller; culms and sheaths* (except the ciliate margin and pubescent ring at the summit of the sheaths) *glabrous or rarely pubescent below, nodes glabrous;* blades commonly 1.5 dm. long, 3 cm. wide, sometimes wider, ciliate toward the very broad base, otherwise glabrous, rarely minutely pubescent; panicle 8–15 cm. long, *the long few-flowered branches ascending; spikelets* 3.5–3.8 *mm. long*, obovate-elliptic, the apiculate tip of the fruit usually glabrous. Autumnal state as in *P. Boscii.* (*P. macrocarpon Le Conte.*) — Rocky woods and sand dunes, Me. to Wisc., and southw.

Steinchísma hians (Ell.) Nash, a lax perennial with narrow flat leaves and terminal panicles with spreading branches naked at base, and crowded spikelets, the *palea of the sterile lemma subindurated, enlarged* and forcing the spikelet open, has been collected in se. Mo. (*Bush*); common in the South.

12. SACCIÓLEPIS Nash.

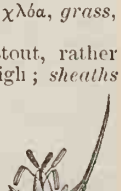
Second glume gibbous at the base, 11-nerved, equal to the 3–5-nerved sterile lemma (which incloses a large palea and often a staminate flower), about twice as long as the slightly stipitate fruit; lemma thinner at the apex, the palea free at the tip; spikelets otherwise as in *Panicum.* Semi-aquatic perennials with narrow spike-like panicles. (Name from σάκκος, *bag*, and λεπίς, *scale*, alluding to the saccate second glume.)

1. **S. striàta** (L.) Nash. Perennial, stoloniferous; culms erect from a creeping base, 3–9 dm. high, branching; sheaths hirsute, at least on the margins; blades 0.8–2 dm. long, about 1 cm. wide, flat, glabrous; panicle 10–15 cm. long, contracted, spike-like; spikelets 3.5 mm. long, lanceolate, acute. (*Panicum gibbum* Ell.) — Low wet ground, Va. to I. T., and southw.

13. ECHINÓCHLOA Beauv.

Spikelets 1-flowered, sometimes a staminate flower below the perfect terminal one, nearly sessile in 1-sided racemes; glumes unequal, spiny-hispid, mucronate; sterile lemma similar and awned from the apex (sometimes mucronate only), inclosing a hyaline palea; fertile lemma and palea chartaceous, acuminate; margins of the glume inrolled except at the summit, where the palea is not included. — Coarse annuals with compressed sheaths, long leaves and terminal panicles of stout racemes. (Name from ἐχῖνος, *a hedgehog*, and χλόα, *grass*, in allusion to the bristling awns.)

1. **E. crusgálli** (L.) Beauv. (Barnyard Grass.) Culms stout, rather succulent, branching from the base, ascending or erect, 3–18 dm. high; *sheaths and blades glabrous;* panicle dense, 1–3 dm. long, of numerous erect or spreading racemes, very variable, deep purple to pale green, erect or drooping; spikelets long-awned or nearly awnless, densely and irregularly crowded in 3 or 4 rows, about 3 mm. long. (*Panicum* L.) — Moist, chiefly manured soil and waste ground, river banks, etc., common throughout, except in the extreme North. Aug.–Oct. (Nat. from Eu.) Fig. 68.



68. E. crusgalli. Spikelet × 3.

E. frumentàcea (Roxb.) Link (*Panicum* Roxb.), Japanese Barnyard Millet, or Billion-Dollar Grass, is an occasional escape from cultivation. It is distinguished from short-awned forms of the preceding chiefly by the more compact panicles with short often incurved branches.

2. **E. Waltèri** (Pursh) Nash. Resembling the preceding, usually taller, *at least the lower sheaths coarsely papillose-hispid;* panicle usually long, more

drooping; *spikelets long-awned, the awn sometimes as much as* 5 *cm. long.* — (*Panicum* Pursh; *P. hispidum* Muhl.) — Marshes and ditches chiefly near the coast, N. H. to Fla.; and in w. Ont. and n. Ill. Aug.–Oct.

3. **E. colòna** (L.) Link. (Jungle Rice.) Tufted, erect or ascending, sparingly branched, 3–6 dm. high; sheaths and blades smooth; *panicle of* 5–10 *dense racemes* (1–6 cm. long) *rather distant and racemose along the axis;* spikelets about 3 mm. long; *glumes and sterile lemma* pubescent, *mucronate-pointed but not awned.* (*Panicum L.*) — Ditches and low ground, Va. and Kan., southw. (Warm regions generally.)

14. SETÀRIA Beauv. Bristly Foxtail Grass

Spikelets as in *Panicum* but surrounded by few or many persistent awn-like branches which spring from the rhachis below the articulation of the spikelets. — Annual introduced weeds in cultivated or manured grounds, or native perennials, with linear or lanceolate flat leaves and cylindrical spike-like panicles. (Name from *seta*, a bristle.) Chaetochloa Scribn.

Perennial by creeping rootstocks	1. *S. imberbis.*
No rootstocks.	
Bristles 5 or more	2. *S. glauca.*
Bristles 1-3.	
Downwardly barbed	3. *S. verticillata.*
Upwardly barbed.	
Lemmas rugose; panicle not exceeding 1.5 dm. in length.	
Spikelets 2 mm. long	4. *S. viridis.*
Spikelets 3 mm. long	5. *S. italica.*
Lemmas smooth and shining; panicle 2–6 dm. long	6. *S. magna.*

1. **S. imbérbis** R. & S. *Culms more or less caespitose*, 3–7 dm. high, slender, compressed, erect or ascending, often geniculate at base; sheaths overlapping, compressed, glabrous; blades 1–3 dm. long, 3–7 mm. wide, attenuate toward the apex; panicle 2–5 cm. long, nearly 1 cm. thick, exclusive of bristles; *bristles* 8–12, 5–10 *mm. long*, pale yellowish, sometimes purplish, upwardly scabrous; *spikelets* 2 *mm. long; first glume about* $\frac{1}{3}$ *as long as the spikelet, second* $\frac{1}{2}$–$\frac{2}{3}$ *as long*, acute, 5–7-nerved, the midnerve excurrent; *sterile lemma equaling the* elliptical-ovate acute striate *transversely rugose fertile lemma.* — Moist soil, Ct. to Kan., and southw. (Trop. Am.)

Var. **perénnis** (Hall) Hitchc. *Culms scarcely tufted*, very slender, wiry, 6–12 *dm. high;* blades long and narrow; panicles 2–7 cm. long, more slender; spikelets and bristles usually purplish. (*Chaetochloa versicolor* Bicknell.) — Brackish marshes along the coast, Ct. to Fla.; and in saline soil, Kan. and I. T. June–Sept. — Intergrades with the species.

69. S. glauca. Spikelet with subtending bristles. Same open, showing fertile and neutral flower × 3.

2. **S. glaúca** (L.) Beauv. (Foxtail, Pigeon Grass.) Annual; culms branching at the base, compressed, erect or ascending, 3–12 dm. high; leaves flat, linear-lanceolate, glaucous; panicle 2–10 cm. long, about 1 cm. thick; *bristles* 3–8 mm. long, *upwardly scabrous; spikelets* 3 *mm. long; first glume* $\frac{1}{2}$, *second* $\frac{2}{3}$ *as long as the striate undulate-rugose fertile lemma.* — Cultivated ground and waste places, common throughout. (Nat. from Eu.) Fig. 69.

3. **S. verticillàta** (L.) Beauv. Annual, tufted; culms 3–6 dm. high; leaves linear-lanceolate, scabrous; *panicles* green, 5–10 cm. long, somewhat compound, *interrupted at base*, tapering above; bristles stout, *downwardly barbed*, 3–6 *mm. long;* spikelets 2–2.5 mm. long; first glume $\frac{1}{3}$ as long as the second which equals the sterile lemma and slightly exceeds the abruptly apiculate obscurely transverse-rugose fertile lemma. — Near dwellings, widely distributed in eastern U. S. (Nat. from Eu.) Fig. 70.

70. S. verticillata. Spikelet × 4.

4. **S. víridis** (L.) Beauv. (Green F., Bottle Grass.) Annual, tufted; culms 2–9 cm. high; leaves 0.5–2.5 dm. long, 4–10 mm. wide, scabrous on the margins; panicles rather thick,

rhachis villous; bristles slender, upwardly barbed, usually 7–12 *mm. long;* spikelets 2 mm. long; second glume and sterile lemma equal, covering the obtuse striate faintly wrinkled fertile lemma. — Cultivated grounds and waste places, throughout. (Nat. from Eu.) Fig. 71. Var. BREVISÈTA (Döll) Hitchc. Bristles scarcely longer than the spikelets. — Sterile soil, n. Me. and adjacent Que.

71. S. viridis. Spikelet × 4.

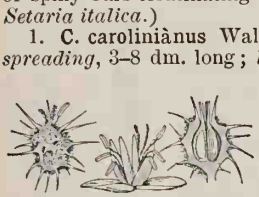
5. **S. ITÁLICA** (L.) Beauv. Annual; *panicle compound*, interrupted at base, *thick, nodding*, 8–20 cm. long, but in escaped specimens smaller, yellowish or purplish; bristles 2 or 3 in a cluster, longer than the spikelets. — Cultivated under the name of MILLET, GERMAN MILLET, or HUNGARIAN GRASS, and rarely spontaneous, as is also Var. GERMÁNICA (Mill.) Richter, GOLDEN-WONDER MILLET, which is more slender and has bristles shorter than the spikelets. (Introd. from Eu.)

6. **S. mágna** Griseb. Probably perennial; *culm* stout, erect, 1–3 *m. high;* sheaths loose, spreading, compressed, margins densely ciliate near the summit; *blades* 3–6 *dm. long*, 1–3 *cm. wide*, attenuate, scabrous; *panicles* usually interrupted below, 2–5 *cm. thick, tapering to both ends;* rhachis densely pilose; bristles 8–11 mm. long, upwardly scabrous; spikelets 2 mm. long; first glume broad, about $\frac{1}{3}$ as long as the second, which equals the sterile lemma and with it covers the acute apiculate *smooth and shining* (*not striate nor rugose*) *fertile lemma.* — Low grounds and marshes, Del., Va., and southw. (Trop. Am.)

15. CÉNCHRUS L. SANDBUR. BUR GRASS

Spikelets 1-flowered, acuminate, 2–6 together, subtended by a short-pediceled ovoid or globular involucre of rigid connate spines which is deciduous with them at maturity; glumes shorter than the lemmas; sterile lemma with a hyaline palea, fertile lemma and palea less indurated than in *Panicum*, falcate-acuminate, the lemma not inrolled at the margins. — Our species annual, with simple racemes of spiny burs terminating the culm and branches. (An ancient Greek name of *Setaria italica*.)

1. **C. caroliniànus** Walt. *Culms* flattened, much branched, *ascending or spreading*, 3–8 dm. long; *leaves flat;* racemes of 8–20 *involucres, about* 8 *mm. thick*, the 6–8 pubescent divisions spine-pointed, spines spreading or reflexed; spikelets 2–3. (*C. tribuloides* Am. auth., not L.) — Sandy soil, on river banks, etc., s. Me. to Fla., and westw. across the continent. Aug. (Trop. regions.) Fig. 72.



72. C. carolinianus × 1½. Closed involucre, at left. Longitudinal section of same, at right. Open spikelet, in middle.

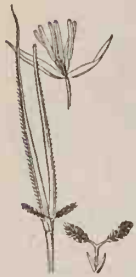
2. **C. tribuloìdes** L. *Culms* more robust, *often extensively branching or trailing*, 3–9 dm. long; sheaths loose, usually hirsute along the margins, ligule conspicuously ciliate; *blades more or less involute;* racemes usually included at the base; *involucres* 12–14 *mm. thick, densely long-pubescent; the stout spines spreading or ascending.* (*C. macrocephalus* Scribn.) — Sands along the coast, N. J. and southw.

16. ZIZÀNIA [Gronov.] L. WATER OF INDIAN RICE

Spikelets unisexual, 1-flowered, the pistillate linear, awned, articulated and tardily deciduous on club-shaped pedicels on the appressed upper branches, the staminate lanceolate, early deciduous, on the expanded lower branches of the same panicle; glumes none in the pistillate spikelet; lemma closely clasping the palea by a pair of strong lateral nerves, a long hispid awn from the summit; first glume of staminate spikelet 5-, the second 3-nerved; stamens 6; grain cylindrical, 1.5–2 cm. long, closely enveloped in the membranaceous lemma and 3-nerved palea. — A tall aquatic grass with long leaves and large terminal panicles. (Adapted from ζιζάνιον, the ancient name of some wild grain.)

1. Z. palústris L. (Indian Rice, Water Oats.) Annual; culms 2–3 m high; leaves flat, 5–10 dm. long, 1.5–4c m. wide. (*Z. aquatica* of auth. not L.) — Swampy borders of streams and in shallow water; common, especially northwestw. July, Aug. (Asia.) Fig. 73.

2. Z. aquática L. Culms about 1 m. high; leaves narrower (less than 1 cm. wide); pistillate portion of panicle more appressed. — Me. to Minn., and northw.



73. Z. aquatica × 1. ♂ spikelet. ♀ spikelet. Pistil with scales.

17. ZIZANIÓPSIS Döll & Asch.

Spikelets unisexual, the pistillate above, the staminate below on each branch of the panicle, much alike in appearance, laterally compressed; glumes subequal, membranaceous, the first glume of the pistillate spikelet with a short terminal awn, the lemma acute, palea none; glumes and lemma of staminate spikelet acute, nerveless, palea none; stamens 6; grain ovoid, with a chartaceous easily separable pericarp, loosely inclosed in the glumes. — A tall aquatic grass with long leaves and long narrow terminal panicles. (Name from *Zizania* and *ὄψις*, *appearance*, from likeness to the preceding genus.)

1. Z. miliàcea (Michx.) Döll & Asch. Perennial by a creeping rootstock; culms 1–4 m. high, geniculate at the lower nodes; leaves flat, 3–10 dm. long, 1–3 cm. wide. (*Zizania* Michx.) — Swamps, Va., O., and southw. May.

18. LEÉRSIA Sw. Cut-grass. White Grass

Spikelets 1-flowered, flattened laterally, perfect, but those in the open panicles usually sterile, those inclosed in the sheaths cleistogamous and fruitful; glumes none, lemma boat-shaped, somewhat indurated, awnless, clasping the palea by a pair of strong marginal nerves; palea of like texture, much narrower, 1-nerved; stamens 1–6. — Perennials of moist ground, with rough leaves and short racemes of imbricated spikelets arranged in open panicles. (Named after *Johann Daniel Leers*, a German botanist of the 18th century.) Homalocenchrus Mieg.

74. L. virginica. A bit of inflorescence × 3. Spikelet × 5.

* *Spikelets narrowly oblong, rather loosely crowded.*

1. L. virgínica Willd. (White Grass.) Culms weak, branched, ascending, *with clustered scaly rootstocks; panicle simple*, the slender branches stiffly spreading; *spikelets* 2.5–3 *mm. long*, closely appressed; lemma hispid on the keel; stamens 2. — Wet woods, Me. to Ont., and southw. Aug. Fig. 74.

2. L. oryzoìdes (L.) Sw. (Rice Cut-grass.) Culms rather stout, branched, ascending from a *decumbent base with slender creeping rootstocks; leaves very rough; panicle diffusely branched*, lax; *spikelets* 4–5 *mm. long*; lemma hispid, strongly bristly ciliate on the keel. — Swamps or stream borders, ditches, etc., Nfd. to Ont., and southw. Aug., Sept. (S. A., Eurasia.) Fig. 75.

75. L. oryzoides. Inflorescence × 1/5. A bit of same × 2/3. Open spikelet × 2.

* * *Spikelets broadly oval, imbricately covering each other.*

3. L. lenticulàris Michx. (Catch-fly Grass.) Culms nearly simple, erect or decumbent at base, with scaly rootstocks; sheaths and blades sometimes nearly smooth; panicle nearly simple; spikelets very flat, 5 mm. long, strongly bristly ciliate. — Low grounds, Va. to Minn., and southw.

19. PHÁLARIS L. Canary Grass

Spikelets 1-flowered, laterally flattened; glumes equal, boat-shaped, much exceeding the florets; sterile lemmas small and narrow, appearing like hairy scales attached to the fertile floret; fertile lemma indurated and shining in fruit, inclosing a faintly 2-nerved palea. — Annuals or perennials, with flat leaves and dense spike-like panicles. (The ancient Greek name, φαλαρίς, alluding presumably to the crest-like inflorescence.)

§ 1. EUPHÁLARIS Godron. *Paniele very dense, spike-like; glumes wing-keeled.*

1. P. canariénsis L. (Canary Grass.) Annual, 3–8 dm. high; panicle oval, 2–3 cm. long; *spikelets broadly obovate*, 5–6 mm. long, imbricated; *glumes white with green veins*, the *keel entire;* fertile lemma brown. — Waste places and roadsides. (Adv. from Eu.)

P. minor Retz. has been collected at St. John, N. B. (*Fowler*) and on ballast at Camden, N. J. (*Pollard*). The spikes are oblong and the glumes are narrowed at the pointed apex, the *exposed portion of the keel being somewhat toothed.*

76. P. arundinacea ×2. Spikelet; same with glumes separated.

§ 2. DÍGRAPHIS (Trin.) Endl. *Paniele branched, the clusters open in anthesis; glumes not winged on the back.*

2. P. arundinàcea L. (Reed C.) Perennial, 6–15 dm. high; leaves flat, 6–10 mm. wide; panicle 6–15 dm. long; *spikelets lanceolate*, 5 mm. long, pale; sterile lemmas reduced to minute hairy scales. — Wet grounds; common, especially northw. June, July. Fig. 76. Var. pícta L., the leaves striped with white, is the familiar Ribbon Grass of the garden. (Eurasia.)

20. ANTHOXÁNTHUM L. Sweet Vernal Grass

Spikelets 1-flowered; glumes very unequal; sterile lemmas 2-lobed, hairy, dorsally awned, longer than the fertile floret and falling with it; fertile lemma truncate, awnless, inclosing a faintly 1-nerved palea and perfect flower; stamens 2. — Aromatic plants with flat leaves and narrow spike-like panicles. (Name compounded of ἄνθος, *flower*, and ξανθός, *yellow.*)

77. A. odoratum. Inflorescence ×½. Spikelet; same with glumes separated ×1½.

1. A. odoràtum L. *Perennial;* culms slender, erect, 2–6 dm. high; leaves rough above; panicles 3–8 cm. long; *spikelets brownish green*, 8–10 *mm. long*, spreading at flowering time; *glumes sparsely pilose;* first sterile lemma short-awned below the apex, second bearing a strong bent *scarcely exserted awn* near its base. — Meadows, pastures, and waste places, throughout, especially eastw. May–July. — Sweet-scented. (Nat. from Eu.) Fig. 77.

2. A. Puèlii Lecoq & Lamotte. Smaller, *annual;* panicles 1–4 cm. long; *spikelets whitish green*, 5–7 *mm. long; the glabrous glumes* narrower than in no. 1; *the long-exserted awn* blackish at base. — Dry fields and waste places, N. E. to Ont. and Pa.; sometimes cultivated westw. and southw. (Nat. from Eu.)

21. HIERÓCHLOË [Gmel.] R. Br. Holy Grass

Spikelets 3-flowered, the terminal flower perfect, the others staminate or empty; glumes subequal, about the length of the spikelet, boat-shaped, shining; sterile lemmas nearly as long as the glumes, boat-shaped, indurated and hairy, each inclosing a 2-nerved hyaline palea and a flower of 3 stamens; fertile lemma similar but smaller, inclosing a 1-nerved palea and perfect flower with 2 stamens.

— Fragrant perennials, with flat leaves and terminal panicles. (Name from ἱερός, *sacred*, and χλόη, *grass*; these sweet-scented grasses being strewn before church-doors on saints' days in the North of Europe.) SAVASTANA Schrank.

1. **H. odoràta** (L.) Wahlenb. (VANILLA OR SENECA GRASS.) Culms 3–6 dm. high, from a creeping rootstock; *leaves* short, lanceolate, scabrous or smoothish; those of the sterile shoots long and *scabrous; panicle pyramidal*, 4–12 cm. long, usually compact but sometimes loose, the slender branches drooping; *spikelets* 5 *mm. long*, brownish; staminate lemmas *hispid-ciliate on the margins* and below the apex on the keel, *awnless;* fertile lemma hairy at the apex. (*H. borealis* R. & S.) — Moist meadows, chiefly northw., near the coast, and along the Great Lakes. May–July. (Eurasia.) FIG. 78. — The loose-panicled form, *Savastana Nashii* Bicknell, is not specifically distinct.

78. H. odorata. Closed spikelet; same opened and with glumes separated × 2.

2. **H. alpìna** (Sw.) R. & S. Culms 1–4 dm. high, tufted; upper sheaths inflated; *blades* very small, *the lowest and those of the sterile shoots* long and *linear, smooth; panicle contracted*, 2–5 cm. long; spikelets 7–8 mm. long, olivaceous; staminate lemmas ciliate on the margins, *the first short-awned below the apex, the second with a longer* (5–8 *mm.*) *bent awn from below the middle;* fertile lemma mucronate. — Alpine regions, N. E., N. Y., and northw. July, Aug. (Eu.)

22. MÍLIUM [Tourn.] L. MILLET GRASS

Spikelets 1-flowered, rhachilla articulated below the floret; glumes equal; lemma slightly shorter, shining, indurated, the margins inrolled over a similar palea; grain inclosed within the lemma and palea, free. — Our species perennial with flat leaves and open panicles. (The ancient Latin name of the millet — which, however, belongs to a different genus — of uncertain meaning.)

1. **M. effùsum** L. Smooth; culms rather slender, simple, 1–1.5 m. high; leaves 1–3 dm. long, 8–15 mm. wide; panicle 1–2 dm. long, the slender branches in remote pairs or fascicles, widely spreading or drooping, spikelet-bearing from about the middle; spikelets 3–3.5 mm. long; glumes minutely scabrous. — Cold damp woods and mountain meadows, N. S. to Ill., and northw. — The fruit (mature floret) resembles that of *Panicum*. June–Aug. (Eu.) FIG. 79.

79. M. effusum. Part of panicle × ⅓. Closed and open spikelets × 3.

23. ORYZÓPSIS Michx. MOUNTAIN RICE

Spikelets 1-flowered, in narrow few-flowered panicles; glumes rather broad, obtuse or abruptly acute; floret with a short obtuse callus; lemma (not over 1 cm. long) convolute, somewhat indurated, including the rather large palea and perfect flower, terminating in a deciduous simple slender awn; grain oblong-ellipsoid, tightly included in the indurated lemma. — Tufted perennials. (Name composed of ὄρυζα, *rice*, and ὄψις, *appearance*, from a fancied resemblance to that grain.)

* *Spikelets, excluding awn, 3–4 mm. long.*

1. **O. púngens** (Torr.) Hitchc. Culms densely tufted, 2–5 dm. high, erect, slender, simple; sheaths usually crowded at the base, smooth or slightly scabrous; blades involute-filiform, the basal ones sometimes as long as the culm, usually half its length, those of the culm short; panicle 3–6 cm. long, branches erect or ascending; glumes subequal, obscurely 5-nerved; lemma usually as long as the glumes, appressed-pubescent; awn 1–2 (rarely 5) mm. long, sometimes wanting; palea as long as the lemma. (*O. canadensis* Man. ed. 6; *O. juncea* BSP.) — Dry rocky or sandy soil, Lab. to N. Y., and westw.

* * *Spikelets, excluding awn, 6–9 mm. long.*

2. **O. asperifòlia** Michx. Culms tufted, 2–7 dm. high, erect or geniculate at the lowest node; *sheaths usually crowded at the base; blades* erect, *scabrous* especially on the *glaucous lower surface*, those of the base often exceeding the culm, 5–8 mm. wide, flat or involute on the margins, attenuate; *culm-leaves usually less than* 1 *cm. long; panicle* contracted, 5–12 *cm. long*, the *branches* simple, *erect; spikelets*, excluding awn, 6–8 *mm. long;* glumes subequal, short-ciliate at the apiculate summit; lemma nearly or quite as long as the second glume, sparingly pubescent; *awn* 5–10 *mm. long; lodicules* ¾ *the length of the palea.* — Wooded hillsides, along waterways, etc., Nfd to B. C., s. to Pa., Minn., and N. Mex. June. Fig. 80

80. O. asperifolia × 1½. Spikelet (below). Floret (above).

3. **O. racemòsa** (Sm.) Ricker. Culms tufted, erect, 3–12 dm. high, *leafy to the summit; leaves* 1–3.5 *dm. long*, 4–15 mm. wide, flat, narrowed toward the base, taper-pointed, *scabrous below, pubescent above;* panicle 7–25 cm. long, *branches* nearly simple, *usually ascending; spikelet*, excluding awn, 7–9 *mm. long;* glumes equal, acute; *lemma* somewhat shorter, pubescent, *becoming black in fruit; awn* 1.5–2.5 *cm. long; lodicules minute.* (*Milium* Sm.; *O. melanocarpa* Muhl.) — Rocky woods, Me. to Ont., southw. to Del. and Ia. June–Oct. Fig. 81.

81. O. racemosa. Spikelet × 1.

24. STÌPA L. Feather Grass

Spikelets 1-flowered, in terminal panicles; glumes narrow, acute or bristle-tipped; floret with a bearded usually sharp-pointed callus; lemma convolute, indurated, including the small palea and perfect flower, terminating in a simple strong persistent geniculate twisted awn; grain cylindrical, tightly included in the indurated fruiting lemma. — Rather large tufted perennials with involute leaves. (Name from στύπη, *tow*, in allusion to the flaxen appearance of the feathery awns of the original species.)

* *Glumes* 4–12 *mm. long.*

+ *Callus blunt; awn* 1 *cm. or less long.*

1. **S. canadénsis** Poir. Culms tufted, 3–6 dm. high; leaves 4–12 cm. long, narrow, involute, scabrous; panicle loose, 5–12 cm. long, the opposite few-flowered branches ascending; glumes subequal, oblong, subacute, 4 mm. long, slightly exceeding the pubescent oblong lemma; awn 6–10 mm. long. (*S. Richardsoni* Man. ed. 6, not Link; *S. Macounii* Scribn.) — Woods and thickets, N. B., Me., N. H., N. Y., n. shore of L. Superior, Sask., and northw.

+ + *Callus acute; awn more than* 1.5 *cm long.*

2. **S. virídula** Trin. Culms clustered, 5–10 dm. high, sparingly branched; basal sheaths overlapping, the long usually scabrous involute or sub-involute blades elongated, upper blades shorter, mostly setaceous; *panicle narrow, erect*, 1–2 dm. long, the *branches* mostly in pairs, *erect, rather densely flowered* from near the base; *glumes* 7–9 mm. long, *acuminate-setaceous*, exceeding the *pale appressed-pubescent lemma;* awn 2–4 cm. long; *callus usually rather short.* — Prairies and meadows, w. Minn., the Dakotas, and southwestw. July, Aug. — Variable.

3. **S. avenàcea** L. (Black Oat Grass.) Culms tufted, slender, erect or ascending, 3–10 dm. high, leafy at the base; sheaths shorter than the internodes; blades 1–1.5 mm. wide, usually involute, the basal ones ⅓–½ the length of the culms,

82. S. avenacea × 1⅓. Flower and glumes.

those of the culm 4–10 cm. long; *panicle loose*, 1–2 dm. long, the slender *branches* in pairs, *lax*, *finally spreading; glumes* often purplish, 8–10 mm. long, *acute*, about equaling the *dark-brown lemma, which is smooth below, scabrous above and bears a fringe of short hairs at the summit; awn* 4–7.5 *cm. long; callus acuminate*, covered with dense brownish hairs.— Dry woods, Mass. to Fla., w. to Wis. and Tex. May, June. Fig. 82.

* * *Glumes* 2 *cm. long or more.*

4. **S. comàta** Trin. & Rupr. Culms erect, simple, 2–12 dm. high; *sheaths* mostly crowded at the base, *the upper often loose and inclosing the base of the panicle;* basal blades usually about ½ the length of the culm, mostly involute-filiform, those of the culm 0.5–1.5 dm. long, 2–4 mm. wide, flat or involute; panicle loose, 1–4 dm. long, branches distant, erect or somewhat spreading, naked below; *glumes* 2–2.8 *cm. long, tapering into a slender fragile awn*, much exceeding the sparsely pubescent lemma; *awn* 10–24 cm. long, *pubescent to the geniculation, scabrous and curved beyond;* callus acute. — Dry plains and hills, Ia., and westw. June, July.

83. S. spartea × ⅔. Floret and base of awn. Glumes.

5. **S. spártea** Trin. (Porcupine Grass.) Culm rather stout, simple, 0.5–1.2 m. high; sheaths mostly overlapping; blades usually involute, basal ones ⅔ the length of the culm, those of the culm 1–3 dm. long; *panicle finally exserted, narrow*, 1–3 dm. long, branches erect, naked below; *glumes* 2.8–3.5 *cm. long, attenuate*, exceeding the brownish lemma, which is appressed-pubescent below, and nearly or quite glabrous above; *awn* 11–20 cm. long, rigid, scabrous, *minutely pubescent below;* callus acuminate, very sharp-pointed, densely clothed with silky appressed hairs. — Plains and prairies, Mich. to Mo., and westw. Fig. 83.

25. ARÍSTIDA L. Triple-awned Grass

Spikelets 1-flowered, in usually narrow panicles; glumes unequal, narrow, acute or acuminate; a hard obconical hairy callus below the floret; lemma somewhat indurated, convolute, including the thin palea and perfect flower, terminating in a trifid awn; grain elongated, tightly included in the lemma. — Tufted annuals or perennials with narrow leaves. (Name from *arista*, a beard or awn.)

Annuals.	
Awns separate to the base.	
Lateral awns much shorter than the middle one.	
Middle awn coiled at base.	
Glumes 7–8 mm long	1. *A. dichotoma.*
Glumes 12–14 mm. long	2. *A. basiramea.*
Glumes 15–20 mm. long	3. *A. ramosissima.*
Middle awn not coiled at base, horizontal	4. *A. gracilis.*
Lateral awns not much shorter than the middle one.	
Glumes 7–9 mm. long; awns 1.4–2.2 cm. long	5. *A. intermedia.*
Glumes 20–30 mm. long; awns 3.5–7 cm. long	6. *A. oligantha.*
Awns united below in a long twisted neck	7. *A. tuberculosa.*
Perennials.	
Awns 5–10 cm. long	8. *A. purpurea.*
Awns not over 3 cm. long.	
Sheaths glabrous	9. *A. purpurascens.*
Sheaths woolly	10. *A. lanosa.*

1. **A. dichótoma** Michx. (Poverty Grass.) Culms tufted, wiry, much branched at the base and usually forking at every node, but in depauperate specimens sometimes nearly simple, 1–6 dm. high; *sheaths loose;* blades mostly involute; panicles few-flowered, simple, narrow, the lateral ones often sessile and partially inclosed in the sheaths; glumes subequal, 7–8 mm. long, cuspidate; *lemmas about* 6 *mm. long*, excluding the awns; *lateral awns reduced to minute*

erect teeth, middle awn 3–6 mm. long, horizontal, coiled at the base in maturity. — Sterile sandy or gravelly soil, Me. to Mo. and southw. Aug.–Oct. Fig. 84.

Var. **Curtíssii** Gray. Differs in being less freely branched; panicles looser; *glumes unequal*, the second 10–12 mm. long, the first $\frac{2}{3}$–$\frac{3}{4}$ as long; *lemma* 7–10 *mm. long*, excluding the awns. — Va. to Mo., and southw.

84. A. dichotoma. Spikelet × 2½.

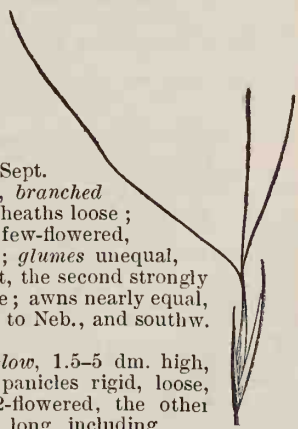
2. **A. basiràmea** Engelm. Resembling *A. dichotoma*, *freely branching at the base; culms sparingly branched;* leaves averaging longer; panicles looser, the terminal often partly included in the upper sheaths, *small panicles commonly borne in the basal sheaths; glumes acuminate, unequal, second* 12–14 *mm. long, the first about* $\frac{2}{3}$ *as long; lemma about* 1 *cm. long*, excluding the awns; lateral awns 2–7 mm. long, erect or spreading, middle awn 1–2 cm. long. — Dry soil and prairies, Ill. to Minn. and Neb. Aug., Sept.

3. **A. ramosíssima** Engelm. Culms tufted, wiry, *repeatedly branching, the branches divergent; leaves mostly setaceous;* panicle loose, few-flowered; *glumes* 1.5–2.5 *cm. long, awned from a bifid apex*, unequal, the second equaling the lemma (excluding the awns); lemma 2–2.3 cm. long; lateral awns minute, erect, *middle awn* 2–3 *cm. long, reflexed by a loose spiral at base.* — Dry prairies, Ind. and Ill. to Tenn. and Mo. Aug., Sept.

85. A. gracilis. Spikelet × 2.

4. **A. grácilis** Ell. Culms slender, in small tufts or solitary, branched at the base, simple or sparingly branched above, 1.5–5 cm. high; *sheaths not loose;* blades 2 mm. or less wide, usually involute in drying; spikelets mostly in a slender raceme (if a panicle, the branches rarely bearing more than 2 spikelets), rather distant below, often crowded above; *glumes unequal*, the *second equaling the floret; lemma about* 6 *mm. long, usually mottled;* middle awn horizontal, 8–15 mm. long, lateral awns erect, 2–6 mm. long. — Sandy soil, N.H. to Mo., and southw. Sept. Fig. 85.

5. **A. intermèdia** Scribn. & Ball. Similar to the preceding but much larger; *culms* 3–7 *dm. high*, more freely branching, *often geniculate at base;* leaves 5–15 cm. long, rigid, involute; panicle 2–4 dm. long, slender, branches short, appressed; *glumes* attenuate-aristate, subequal or the second longer, 7–9 *mm. long*, scabrous, slightly shorter than the floret; lemma scabrous above the middle, sometimes mottled; *awns all spreading, the middle one* 18–22 *mm. long, lateral ones* 14–17 *mm. long*, all variable. — Dry soil, Ia. and Kan. to Miss. and Tex. Aug., Sept.



86. A. oligantha. Spikelet × ⅔.

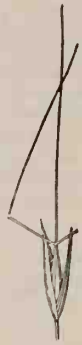
6. **A. oligántha** Michx. *Culms* tufted, wiry, *branched at base and at all the nodes*, 3–6 dm. high; sheaths loose; blades long, usually involute; panicle or raceme few-flowered, the axis often flexuous and spikelets spreading; *glumes* unequal, *long-awned from a bifid apex*, exceeding the floret, the second strongly 7-nerved; *lemma* 17–20 *mm. long*, scabrous above; awns nearly equal, divergent, 3.5–7 cm. long. — Dry sterile soil, N. J. to Neb., and southw. Fig. 86.

7. **A. tuberculòsa** Nutt. *Culms branched below*, 1.5–5 dm. high, *tumid at the joints;* leaves long and involute; panicles rigid, loose, the branches in pairs, one short and about 2-flowered, the other elongated and several-flowered; glumes 2.5 cm. long, including their slender-awned tips; *lemma* 12–15 *mm. long, the twisted base of the awns of equal length;* awns divergent, subequal, 3.5–5 cm. long. — Dry sandy soil near the coast, Mass. to Miss.; and about the Great Lakes. Aug.–Oct. (Mex.) Fig. 87.

8. **A. purpùrea** Nutt. *Culms simple*, 3 dm. high or less, densely tufted, spreading; leaves involute and filiform; ligule pilose; panicle loose, of rather few slender-pediceled spikelets; glumes 1-nerved, the first about half the length of the second, which is 1.5–2 cm. long, *awns* 5–10 *cm. long.* — Dry prairies, Minn. southw. and westw.

87. A. tuberculosa. Spikelet × 2/3.

9. **A. purpuráscens** Poir. In small tufts, glabrous, 3–6 dm. high; culms erect, simple or sparingly branched; *leaves* 1–2 dm. long, 1–4 mm. wide, *usually involute toward the ends; panicle purplish, very slender,* $\frac{1}{3}$–$\frac{1}{2}$ *the entire length of the plant*, loosely or rather densely flowered; glumes 10–12 mm. long, 1-nerved, scabrous, the first slightly the longer, attenuate-aristate, the second aristate from a bidentate apex; lemma 6–7 mm. long; awns divergent, not twisted, 1.5–3 cm. long, the middle somewhat longer than the lateral. — Sandy or gravelly soil, Mass. to Minn., and southw. (W. I.) Fig. 88. — Variable; a very delicate, apparently annual, form occurs in wet sands and drying sloughs in n. Ind.



88. A. purpurascens. Spikelet × 1.

10. **A. lanòsa** Muhl. Culms stout, erect, simple, 6–12 dm. high; *sheaths (at least the lower) woolly; blades flat*, 3–6 *dm. long*, 3–6 mm. wide; panicles nearly half the length of the entire plant, narrow, rather loosely flowered, nodding; glumes subequal, 1–1.4 cm. long, the first slightly the longer, acuminate, the second mucronate from a bidentate apex; lemma spotted, about 1 cm. long; lateral awns 10 mm. long, the divergent middle awn 1.5–2 cm. long. (*A. lanata* Poir., not Forsk.) — Dry pine barrens, mostly near the coast, Del. to Tex. and I. T. Sept., Oct.

26. MUHLENBÉRGIA Schreb.

Spikelets 1-flowered, in contracted (rarely open) panicles; a short usually barbate callus below the floret; glumes thin, often aristate; lemma narrow, membranaceous, 3-nerved, awned or awnless, inclosing a thin subequal palea; grain closely enveloped by the lemma. — Our species perennial, often with scaly rootstocks, flat or involute leaves and small spikelets. (Dedicated to the *Rev. Dr. Henry Muhlenberg*, a distinguished American botanist, 1753–1815.)

a. Panicle more or less contracted, not diffuse; culms branched; leaves flat *b.*
  b. Glumes at least one-half as long as the floret *c.*
    c. Glumes broadly ovate, more or less clasping, one-half to two-thirds as long as the floret.
      Spikelets 1.5–2 mm. long; lemmas awnless . . . . . 1. *M. sobolifera.*
      Spikelets 3-4 mm. long; lemmas awned . . . . . 2. *M. tenuiflora.*
    c. Glumes lanceolate, acute to aristate-pointed.
      Glumes not longer than the lemmas.
        Panicles linear or filiform, spikelets not crowded . . . . . 3. *M. sylvatica.*
        Panicles oblong or cylindrical, long-exserted, spikelets crowded, more or less glomerate . . . . . 4. *M. foliosa.*
        Panicles ovoid or subpyramidal, numerous, short-exserted or partially included . . . . . 5. *M. mexicana.*
      Glumes much exceeding the awnless lemmas . . . . . 6. *M. racemosa.*
  b. Glumes not more than one-fourth as long as the florets . . . . . 7. *M. Schreberi.*
a. Panicle diffuse; culms simple; leaves involute . . . . . 8. *M. capillaris*

§ 1. EUMUHLENBÉRGIA Dalla Torre & Harms. *Panicles contracted or glomerate, on branching culms usually from scaly creeping rootstocks; leaves flat.*

* *Glumes at least* $\frac{1}{2}$ *as long as the floret, scabrous on the keel; all the species with clusters of scaly rootstocks.*

← *Glumes broadly ovate,* $\frac{1}{2}$–$\frac{3}{4}$ *as long as the floret, which is often conspicuously hairy at base.*

1. **M. sobolífera** (Muhl.) Trin. *Culms* erect or ascending, sparingly branched, 4–8 dm. high, *scabrous below the glabrous nodes*, leafy toward the summit,

lower leaves distant; blades 8–12 cm. long, 4–6 mm. wide, spreading, scabrous; panicles very slender, usually loose-flowered, 1–1.5 dm. long (lateral panicles if present much shorter); spikelets 1.5–2 mm. long; the acute or abruptly cuspidate glumes $\frac{2}{3}$–$\frac{3}{4}$ as long as the scabrous acute lemma. — Rocky woods, N. E. to Minn., and southw. Sept., Oct.

2. **M. tenuiflòra** (Willd.) BSP. Similar to the preceding; *culms* often taller, *retrorsely puberulent, at least below, nodes pubescent; panicle* 1.5–3 *dm. long*, loosely flowered; *spikelets* 3–4 *mm. long;* the *glumes* abruptly acuminate, *scabrous*, $\frac{1}{2}$–$\frac{2}{3}$ as long as the floret, the *first very broad, clasping;* lemma tapering into a slender awn 5–10 mm. long. (*M. Willdenowii* Trin.) — Rocky woods and ravines, Mass. to Ont., Minn., and southw. Aug., Sept.

+ + *Glumes lanceolate, acute or aristate-pointed.*

++ *Glumes not longer than the lemma; culms more or less compressed, retrorsely strigose below the glabrous nodes; leaves scabrous, ascending.* (These three species are exceedingly variable; each has an awned and an awnless form. The length of the glumes, which are acuminate to aristate, is an unstable character, often varying to the extremes in the same panicle.)

3. **M. sylvática** Torr. Culms erect or ascending, 6–9 dm. high, freely branching, leafy; leaves 5–18 cm. long, 2–6 mm. wide; *panicles usually short-exserted*, 1–2 dm. long, *linear or filiform; spikelets not crowded, on rather long erect branches, usually green or stramineous*, 2.5–3 *mm. long;* glumes acuminate, sometimes aristate, shorter than the scabrous lemma, which is mucronate or tipped with a slender awn as much as 6–12 mm. long. — Moist rocky woods and wooded banks, N. B. to Ont., Ia., and southw. Aug.–Oct.

4. **M. foliòsa** Trin. Similar to the preceding in size, habit and foliage; *panicles long-exserted*, 8–15 cm. long, *oblong or cylindrical, glomerate; spikelets* more or less *densely crowded on the rather short ascending or appressed branches, usually purple; glumes mucronate or aristate, nearly or quite as long as the* awned or awnless *lemma.* (*M. ambigua* Torr.) — Swampy ground, Me. to Ont., S. Dak., and southw. Sept.

89. M. mexicana. Spikelet × 3.

5. **M. mexicàna** (L.) Trin. Similar to *M. foliosa*, often branching at the base; the culms decumbent and rooting at the lower nodes; *panicles numerous*, 5–10 *cm. long, ovoid or subpyramidal, terminal on the culm and its many rather short branches, usually partly inclosed within the upper sheath; glumes acuminate or aristate, about as long as the* acute, acuminate or awned *lemma* which is sometimes smooth. (*M. polystachya* Mackenzie & Bush.) — Sandy and gravelly stream-banks and waste ground, N. B. to Ont., S. Dak., and southw. Aug., Sept. Fig. 89.

++ ++ *Glumes aristate, much exceeding the awnless lemma.*

6. **M. racemòsa** (Michx.) BSP. Culms erect, 3–9 dm. high, simple or sparingly branched; blades 5–12 dm. long, scabrous; panicles 5–10 cm. long, dense and spike-like, or interrupted at base; spikelets 4–6 mm. long; the aristate glumes subequal, much exceeding the acute lemma. (*M. glomerata* Trin.) — Moist meadows and low ground, Nfd. to N. J., and westw. Aug.–Oct. Fig. 90.

90. M. racemosa. Spikelet × 3.

* * *Glumes not more than* $\frac{1}{4}$ *the length of the floret; no clusters of scaly rootstocks.*

7. **M. Schrebèri** J. F. Gmel. (Drop-seed, Nimble Will.) Culms 3–8 dm. long, erect or ascending from a decumbent base, often rooting at the lower nodes, diffusely much branched; blades 3–8 cm. long, 2–4 mm. wide; panicles 5–15 cm. long, numerous, slender, the erect branches rather densely flowered; spikelets (excluding the awn) 2 mm. long; *first glume obsolete or nearly so, the second minute, truncate;* lemma tapering into a slender awn 3–5 mm. long. (*M. diffusa* Schreb.) — Dry woods, hillsides and waste places, Me. to Ont., Minn., and southw. Aug., Sept.

Var. **palústris** Scribn. Similar to the species; *culms* reclining or ascending, *very slender or almost filiform;* leaves 2–4 cm. long, 2–3 mm. wide; panicles 5–10 cm. long, very slender, *more loosely flowered; spikelets* (excluding the awn) 2.5 mm. long, *usually purple; glumes acute, unequal, the first about* $\frac{1}{3}$, *the second about* $\frac{1}{4}$ *the length of the bidentate awned lemma;* awn flexuous, 4–6 mm. long. (*M. palustris* Scribn.) — Swampy ground, D. C. and Ill. Sept., Oct.

91. M. capillaris. Spikelet × 3.

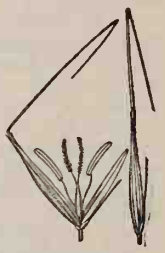
§ 2. TRICHÓCHLOA (Beauv.) Trin. *Panicle very loose and open, the long branches and pedicels capillary; leaves narrow, often convolute-bristle-form.*

8. **M. capillàris** (Lam.) Trin. (Hair Grass.) Caespitose, erect, with simple rigid culms, 6–10 dm. high; sheaths overlapping; *blades* 1–3 dm. long, *involute*, rigid; *panicle about* $\frac{1}{3}$ *the entire height of the plant, its spreading capillary branches loosely flowered;* spikelets purple, 4 mm. long (excluding the awn); glumes subequal, acute, or the second aristate-pointed, about $\frac{1}{2}$ as long as the lemma which bears a delicate awn 5–20 mm. long. — Dry sandy or gravelly soil, Mass. to Fla., west to Mo. and Tex. Fig. 91.

27. BRACHYÉLYTRUM Beauv.

Spikelets 1-flowered, in a few-flowered narrow panicle; glumes minute, unequal; floret with a short callus, the rhachilla prolonged behind the palea into a slender naked bristle; lemma firm, narrow, 5-nerved, terminating in a long straight awn; palea firm, nearly as long as the lemma; grain oblong, inclosed in the lemma and palea. — Perennials, with simple culms from short knotty rootstocks. (Name composed of βραχύς, *short*, and ἔλυτρον, *husk*, from the minute glumes.)

1. **B. eréctum** (Schreb.) Beauv. Culms erect, 5–10 dm. high; sheaths sparsely retrorse-hispid; blades 8–15 cm. long, 1–1.8 mm. wide, lanceolate, very scabrous, pilose on the nerves beneath; panicle narrow, 1–2 dm. long; spikelets 1 cm. long (excluding the awns), on capillary pedicels; first glume often obsolete, second sometimes aristate; floret scabrous. (*B. aristatum* Beauv.) — Rocky woods, Nfd. to Minn., and southw. July, Aug. Fig. 92.



92. B. erectum. Spikelets × 1½.

28. HELEÓCHLOA Host

93. H. schoenoides. Inflorescence × ½. Spikelets × 3.

Spikelets 1-flowered, flattened, in dense oblong-ovoid spike-like panicles; glumes awnless, shorter than the 1-nerved lemma which subtends a palea of nearly equal length. — Low caespitose branching annuals, the numerous spike-like panicles partly included in the inflated sheaths. (Name from ἕλος, *a meadow*, and χλόα, *grass*.)

1. **H.** schoenoìdes (L.) Host. Usually almost prostrate; leaves rather rigid, tapering to a sharp point; spike 1.5–4 cm. long. — Waste places, N. Y. to Del. and e. Pa.; also Chicago, Ill. (*Bebb*). (Adv. from Eu.) Fig. 93.

29. PHLÈUM L.

Spikelets 1-flowered, flattened, in dense cylindrical spike-like panicles; glumes equal, ciliate on the keels, and abruptly awn-pointed, longer than the

broad truncate 5-nerved hyaline lemma; palea nearly equal, narrow. — Erect simple perennials, with flat leaves and terminal spike-like panicles. (From φλέως, a Greek name for a kind of reed.)

1. **P. pratense** L. (Timothy, Herd's Grass.) *Culms* 4–10 *dm. high*, from a swollen base; *panicle long-cylindrical; awn of glumes* 1 *mm. long* — Meadows, commonly cultivated for hay. (Nat. from Eu.) Fig. 94.

2. **P. alpinum** L. *Culms* 2–6 *dm. high; panicle narrowly ellipsoid or short-cylindrical; awn of glumes* 2 *mm. long.* — Alpine regions of N. E. and northw.; also Upper Mich. (Eurasia.)

94. P. pratense. Floret raised from the glumes × 3.

30. ALOPECÙRUS L. Foxtail Grass

Spikelets 1-flowered, flattened, falling from the axis entire, in slender spike-like panicles; glumes equal, awnless, usually connate at the base, ciliate on the keel, the broad 5-nerved obtuse lemma nearly equal in length, with a slender erect dorsal awn from below the middle; margins connate near the base; palea none. — Branching perennials with flat leaves and soft dense spike-like panicles. (Name from ἀλώπηξ, *fox*, and οὐρά, *tail*, from the shape of the spike.)

1. **A. pratensis** L. (Meadow F.) Erect, glabrous; culms 3–9 dm. high, from short creeping rootstocks; sheaths loose, the upper usually inflated; leaves scabrous; panicle 5–10 cm. long; *spikelets* 5 *mm. long; the lemma equaling the acute long-ciliate glumes; awn usually exserted about* 5 *mm.* — Meadows and pastures, eastw. May. (Nat. from Eu.)

2. **A. geniculatus** L. (Floating F.) Glabrous or nearly so; culms slender, decumbent and branched at base, then erect or ascending, 1.5–6 dm. high; leaves slightly scabrous; panicles slender, 2.5–7.5 cm. long; *spikelets about* 3 *mm. long; lemma shorter than the obtuse long-ciliate glumes; awn bent, the exserted portion usually twice as long as the glumes.* — Moist meadows, banks of streams and ditches, Nfd. to B. C., and throughout U. S. June–Aug. (Eurasia.) Fig. 95.

Var. **aristulatus** Torr. Spikelets slightly smaller, awn very slender and scarcely exserted. — In water and wet places, common. June–Aug. — In the Western States these two forms seem inseparable and indigenous, but in the eastern portion of our range the former appears to be introduced and is easily distinguished by its longer awns and usually geniculate or creeping base. The variety appears to be the same as *A. fulvus* Sm. of Eurasia.

95. A. geniculatus. Inflorescence × 1/4. Bit of same × 1. Spikelet and lemma × 3.

3. **A. agrestis** L. Glabrous; culms erect or decumbent at base, 3–6 dm. high; leaves scabrous; panicle rather slender, 3.5–10 cm. long; *spikelets* 6–7 *mm. long; glumes* very short-ciliate on the keels, *connate for* ⅓ *their length, slightly shorter than the lemma;* awn twice the length of the glumes or more. — Waste places and ballast, Mass., N. J., Pa.; and on Pacific coast (Adv. from Eu.)

31. SPORÓBOLUS R. Br. Drop-seed. Rush Grass

Spikelets 1-flowered, awnless, in narrow and spike-like, or loose and spreading, often partly included, panicles; lemma as long as or longer than the usually unequal glumes, 1-nerved; palea equaling or exceeding the lemma, often splitting between the strong nerves at maturity; grain readily falling from the spikelet, pericarp loosely inclosing the seed, often thin and evanescent. — Annuals or perennials with involute or flat leaves. (Name from σπορά, *seed*, and βάλλειν, *to cast forth.*)

Panicles contracted.
Rootstocks short or slender or none; culms tufted or solitary.
Panicle not more than one-third the entire height of the plant.
Perennials.
Spikelets 5 mm. long or more; panicle dense.
Floret appressed-puhescent helow.
Lemma two-thirds as long as palea . . . . . 1. *S. clandestinus.*
Lemma and palea suhequal . . . . . 2. *S. canovirens.*
Floret glahrous . . . . . 3. *S. asper.*
Spikelets not over 4 mm. long; panicle interrupted.
Culms smooth; ligule 0.5 mm. long . . . . . 4. *S. brevifolius.*
Culms minutely roughened by septae; ligule 2 mm. long . . 5. *S. Richardsonis.*
Annuals.
Spikelets 4 mm. long; lemma pubescent . . . . . 6. *S. vaginiflorus.*
Spikelets 2.5–3 mm. long; lemma glabrous . . . . . 7. *S. neglectus.*
Panicle one-third to one-half the entire height of the plant . . . 8. *S. indicus.*
Rootstocks stout, extensively creeping . . . . . 9. *S. virginicus.*
Panicles open (often contracted in no 10).
Glumes very unequal.
Spikelets 2.5-3 mm. long; glumes ovate or lanceolate.
Sheaths bearded at the throat; hlades flat . . . . . 10. *S. cryptandrus.*
Sheaths not hearded; blades involute . . . . . 11. *S. junceus.*
Spikelets 4–6 mm. long; first glume awl-shaped . . . . . 12. *S. heterolepis.*
Glumes suhequal.
Plants compressed at base; leaves conduplicate . . . . . 13. *S. compressus.*
Plants not compressed; leaves flat . . . . . 14. *S. uniflorus.*

1. S. clandestinus (Spreng.) Hitchc. Tufted culms 4–12 dm. high; lower leaves long, subrigid, *the margins and involute-filiform tips scabrous;* panicle 5–15 cm. long, often partially inclosed in the upper sheath; *spikelets* 6–8 *mm. long; glumes unequal*, acute, the first ½ the length of the *acute lemma*, the second ½ that of the *long-acuminate pointed palea; lemma and palea appressed-pubescent toward the base*, the lemma ⅔ the length of the palea. (*S. asper* Man. ed. 6.) — Sandy fields and dry hills, Ct. to Ill., Mo., and southw. Sept. Fig. 96.

96. S. cland. Spikelet × 3.

2. **S. canóvirens** Nash. Similar to the preceding but smaller; the shorter *leaves hirsute near the base;* panicle smaller; *spikelets about* 6 *mm. long; lemma and palea acute, subequal.* — Sandy soil, Tenn., Mo., and southw.

3. **S. ásper** (Michx.) Kunth. Culms stout, 3.5–10 dm. high; sheaths overlapping; *blades* nearly as long as the culm, the upper exceeding the panicle, *pilose above at the flat base, the long involute-filiform tip scabrous; terminal panicle* 8–25 *cm. long, partly included in the inflated upper sheaths, lateral panicles small, usually hidden in the sheaths, or none;* spikelets 5–6 mm long; *glumes unequal, obtuse or subacute*, the first about ½ as long as the floret; *lemma and palea glabrous, the lemma slightly the longer.* (*S. longifolius* Wood.) — Dry sandy soil, Me. to S. Dak., and southw. Fig. 97.

97. S. asper. Spikelet × 3.

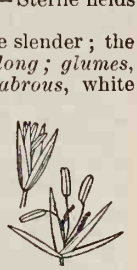
4. **S. brevifòlius** (Nutt.) Scribn. Tufted culms 3–6 dm. high, very slender; leaves involute-filiform; *ligule* 0.5 *mm. long, erose-truncate; panicle very slender, loosely flowered*, 5–10 cm. long; *spikelets about* 4 *mm. long; glumes acuminate*, subequal, ⅔ *as long as the short-cuspidate lemma*, which slightly exceeds the palea. (*S cuspidatus* Wood.) — Dry open ground, Wis. to Mo., and westw.

5. **S. Richardsònis** (Trin.) Merr. Similar to the preceding, 2–5 dm. high; *culms* erect or ascending from a slender horizontal rootstock, *minutely roughened* by septae; *ligule* 2 *mm. long, acute;* panicle 1–6 (rarely 10) cm. long; *spikelets* somewhat crowded, 3 *mm. long; glumes acute, less than* ½ *as long as the cuspidate lemma* (*the cusp about* 1 *mm. long*) which exceeds the palea. (*S cuspidatus*, in part, and *S. depauperatus* Man. ed. 6; *S. brevifolius* Nash, as to description, not Scribn.) — Meadows and along rivers, N. B and Me.; Neb., and in the far West. Aug.

6. **S. vaginiflòrus** (Torr.) Wood. Tufted culms 2–6 dm. high, slender, erect to widely spreading; leaves about 2 mm. wide, involute toward the end; *panicles numerous, partially included in the inflated sheaths*, or the terminal

panicle exserted, 2–4 cm. long; *spikelets 4 mm. long;* the acuminate glumes usually subequal, nearly as long as the acuminate *scabrous minutely appressed-pubescent lemma*, which is exceeded by the sharp-pointed palea. — Sterile fields and waste places, s. Me. to S. Dak., and southw. Sept.

7. **S. negléctus** Nash. Similar to the preceding, usually more slender; the panicles smaller, more completely inclosed; *spikelets 2.5–3 mm. long; glumes, lemma, and palea all subequal, acute, thinner in texture, glabrous*, white and shining. — Sterile or sandy soil, N. B. to S. Dak., s. to Va. and Tex. Fig. 98.


98. S. neglectus. Spikelets × 4.

8. **S. ínDICUS** (L.) R. Br. (Smut Grass.) Tufted culms 3–10 dm. high, erect, wiry; leaves 10–30 cm. in length, long-attenuate; *panicle ⅛–½ the entire height of the plant; spikelets 2 mm. long*, shining, *crowded on the slender erect branches;* glumes obtuse, unequal, the second ½ as long as the acuminate lemma which is slightly longer than the obtuse palea. — Waste ground and fields, Va. to Ark., and southw. Aug., Sept. — Panicle frequently affected with a black fungus, hence the common name. (Nat. from trop. regions.)

9. **S. virgínicus** (L.) Kunth. Glabrous; culms erect, 1.5–5 dm. high; sheaths overlapping; *blades firm, involute, conspicuously distichous on the numerous sterile shoots;* panicles exserted, 3–6 cm. long; spikelets 3 mm. long; the glumes unequal, the second exceeding the glabrous floret. — Sandy shores, Va. to Fla. Aug., Sept. (Trop. regions.)

99. S. cryptandrus. Open spikelet with glumes detached × 4.

10. **S. cryptándrus** (Torr.) Gray. Tufted, 4–7 dm. high; culms rather stout, erect or somewhat spreading; *sheaths* overlapping, ciliate on the margin and *conspicuously bearded at the throat; blades* 6–12 dm. long, 3–5 mm. wide, *flat, scabrous;* panicle lead-colored, usually open, 12–20 cm. long, included at base in the upper sheath, or sometimes contracted and wholly included; *spikelets 2–2.5 mm. long;* first glume about ⅓ as long as the second; lemma acute, longer than the palea. — Sandy soil, especially on the coast and about the Great Lakes, N. E. to Minn., s. to Pa. and Tex. Aug., Sept. (Mex.) Fig. 99.

11. **S. júnceus** (Michx.) Kunth. Tufted, glabrous, 4–7 dm. high; culms wiry, erect, leafy at the base, naked above; the *involute-setaceous basal leaves 12–24 cm. long, spreading; panicle purplish or chestnut, the short verticillate branches spreading;* spikelets 3 mm. long; first glume about ⅓ the length of the second, which is as long as the glabrous subacute equal lemma and palea. (*S. gracilis* Merr.; *S. ejuncidus* Nash.) — Dry sandy soil, Va. to Fla., w. to Tex. Aug. Fig. 100.

100. S. junceus. Spikelet × 3.

12. **S. heterólepis** Gray. Tufted, 6–9 dm. high; culms rather stout, wiry, erect; basal leaves about ½ as long as the culm, involute-setaceous; *panicles long-exserted*, 7–25 cm. long, branches ascending; *spikelets 4–6 mm. long;* first glume about ½–⅔ the length of the floret, the second acuminate, often cuspidate (varying in length in the same panicle), exceeding the glabrous obtuse or subacute equal lemma and palea; *grain very large, pericarp shining, indurated, splitting the palea.* — Dry soil and prairies, w. Que. to Man., s. to Ct., Pa., Mo. and Tex. Aug., Sept. — Strong-scented. Fig. 101.

101. S. heterolepis. Spikelet × 3.

13. **S. compréssus** (Torr.) Kunth. Perennial from short scaly rootstocks, *flattened at base;* culms 3–6 dm. high, leafy to the top; the sheaths overlapping; leaves conduplicate: *panicle ¼–⅓ the length of the entire plant*, loosely flowered; *spikelets 2 mm. long;* the acute glumes shorter than the striate scabrous lemma which equals the palea. (*S. Torreyanus* Nash.) — Bogs in pine barrens, L. I. and N. J. Sept. — Spikelets rarely 2-flowered.

102. S. uniflorus Spikelet × 3.

14. **S. uniflòrus** (Muhl.) Scribn. & Merr. Rootstocks very slender; culms delicate, tufted, erect, 2–4 dm. high; leaves 1–2 mm. wide; *panicle ⅛–¼ the length of the culm*, loosely

flowered, branches solitary, much divided; spikelets 1.5 mm. long; the obtuse or erose glumes about $\frac{1}{3}$ as long as the equal glabrous obtuse lemma and palea. (*S. serotinus* Gray.) — Bogs and wet sandy soil, Me. to N. J. and Mich. Aug., Sept. FIG. 102.

32. AGRÓSTIS L. BENT GRASS

Spikelets 1-flowered; glumes subequal and acute, longer than the broad obtuse lemma which is awnless or dorsally awned; palea hyaline, shorter than the lemma, or obsolete; grain loosely inclosed in the lemma. — Annuals or perennials with usually flat scabrous leaves, membranaceous ligules and open or contracted panicles. (Name from ἀγρός, *a field*, the place of growth.)

Palea at least one-half as long as the lemma, 2-nerved.
- Culms erect or decumbent at base . . . . . 1. *A. alba.*
- Culms prostrate, rooting at the nodes . . . . . (1) *A. alba*, v. *maritima.*

Palea minute and nerveless or wanting.
- Awn long and very delicate . . . . . 2. *A. Elliottiana.*
- Awn short or none.
  - Panicle diffuse, branches long and capillary . . . . . 3. *A. hyemalis.*
  - Panicle spreading but not diffuse.
    - Lemma awnless . . . . . 4. *A. perennans.*
    - Lemma awned.
      - Spikelets 2 mm. long . . . . . 5. *A. canina.*
      - Spikelets 3 mm. long . . . . . 6. *A. borealis.*

1. **A. álba** L. (FIORIN or WHITE B., RED TOP.) *Rootstocks creeping or stoloniferous;* culms 3–10 dm. high, often decumbent at base; leaves flat, stiff and upright to lax and spreading, the ligule 4–5 mm. long; panicle 5–30 cm. long, contracted after flowering, greenish, purplish, or brownish, the branches slightly rough; lemma nearly equaling the glumes, 3-nerved, rarely short-awned, *the palea* $\frac{1}{2}$–$\frac{2}{3}$ *as long.* — Meadows and fields; a valuable grass naturalized from Eu. and native northw. and westw. Var. VULGÀRIS (With.) Thurb. (RED TOP, HERD'S GRASS of Pa., etc.) Culms lower, more slender, with narrow leaves; *panicle* smaller and more divaricate, *not contracted after flowering;* ligule short and truncate. (*A. vulgaris* With.) — Dry knolls and hills. (Nat. from Eu. and cultivated, also perhaps indigenous.) FIG. 103. — One form (*A. stolonifera* auth., not L.) is cultivated as a lawn grass under the name CREEPING BENT. A teratological form (due to the presence of nematodes in the abortive ovaries) with floral parts elongated (*A. sylvatica* L.), occurs in N. E.

103. A. alba, v. vulg. Panicle × $\frac{1}{4}$. Spikelet × 3.

Var. **aristàta** Gray. Culms slender and strict, with small open panicle; *lemma awned from near the base.* (*A. stricta* Willd.) — Open ground, Me. to Va. — In habit resembling *A. canina*, with which it is often confused.

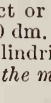
Var. **marítima** (Lam.) G. F. W. Mey. *Culms* densely tufted, *prostrate, rooting at the nodes; leaves mostly short and appressed; panicle contracted, dense, about* 1 *dm. long.* (*A. coarctata* Ehrh.) — Brackish meadows or wet sands along the coast, Me. to Del. (Eu.)

2. **A. Elliottiàna** Schultes. *Culms delicate,* 1–4 *dm. high;* leaves very slender; *panicle open, weak, and drooping;* glumes nearly equal, roughish on the keel and margins, the lemma shorter, with 2 minute bristles at the truncate apex; *awn* 5 *mm. long; palea minute.* — In dry soil, Mo. to Ky., Tenn., and S. C. May–July.

3. **A. hyemàlis** (Walt.) BSP. (HAIR GRASS.) Culms very slender, erect, 3–6 dm. high; *leaves short and narrow, the tufted basal ones soon involute,* the upper 2–7 cm. long, less than 2 mm. wide; panicle purplish, the *whorled scabrous branches spikelet-bearing at the ends;* spikelets 1.5–2 mm. long; lemma awnless or rarely short-awned on the back, shorter than the rather unequal *very acute glumes;* palea obsolete. (*A. scabra* Willd.) — Dry or moist open woodland, sandy low land, rocks, etc., common. June–Aug. — A form with

awned lemmas occurs from Me. to Tenn., and especially in the White Mountains; at higher altitudes this and also the awnless form tend to be more tufted, with numerous short radical leaves. (*Trichodium montanum* Torr.; *A. laxiflora*, var. *montana* Tuckerm.; *A. scabra*, var. *montana* Man. ed. 6.)

4. **A. perénnans** (Walt.) Tuckerm. (Thin Grass.) Culms erect or somewhat decumbent, varying from weak and lax to stout and tall, 3–10 dm. high; leaves numerous, 1–2 dm. long, 1–6 mm. wide; panicle ovoid-subcylindric, the *slender ascending branches dividing and spikelet-bearing from about the middle, the pedicels often divergent;* spikelets 2–3 mm. long; lemma shorter than the acuminate unequal glumes. (*A. intermedia* Scribn.) — Low open ground or damp shaded places, Me. to Minn., and southw. Sept., Oct. — Variable in habit; in deep shade the culms weak and decumbent, the panicles more open with fewer branches, conspicuously divaricate. Flowers later than any other species of *Agrostis* in the eastern states. Fig. 104. Var. elàta (Pursh) Hitchc. Differs in having more slender and elongated culms, but particularly in the crowding of the spikelets at the ends of the branches, giving them a more drooping appearance. (*A. elata* Trin.; *A. altissima* Tuckerm.; *Cornucopiae altissima* Walt. is doubtful, probably *A. alba* L.) Swamps near the coast, N. J. to Miss.



104. A. perennans. Spikelet × 3.

5. **A. canìna** L. (Brown Bent Grass.) Culms 2–6 dm. high, erect, slender; basal leaves involute-setaceous, those of the culm flat and broader; *panicle* at first loose, *contracted in fruit; spikelets* 2 *mm. long;* glumes subequal, acute; *awn inserted about the middle, longer than the glumes, bent.* — Meadows, sparingly naturalized eastw.; cultivated as a lawn grass under the name Rhode Island Bent. (Nat. from Eurasia.)

6. **A. boreàlis** Hartm. Culms tufted, 1–4 dm. high; leaves tufted at base, few on the culm; *panicle open, the lower branches whorled and spreading; spikelets* 2.5–3 *mm. long;* awn exserted 1–3 mm. beyond the glumes, rarely short or obsolete. (*A. rubra* auth., not L.; *A. canina*, var. *alpina* Oakes; *A. novae-angliae* Vasey.) — Lab. to Alaska and mts. of N. E. and N. Y.; also Roan Mt., N. C. (Eu.) — Dwarf forms of high altitudes and latitudes approach dwarf forms of *A. hyemalis.* Some of these have been referred to *A. rupestris* All., which seems not to occur in N. A. Fig. 105.

105. A. borealis. Spikelet × 3½.

33. POLYPÒGON Desf. Beard Grass

Spikelets 1-flowered, in a dense spike-like panicle; glumes subequal, entire or 2-lobed, bearing a straight awn from the apex; lemma much shorter than the glumes, broad, emarginate or bifid at the apex, awned; palea smaller than the lemma; stamens 1–3. — Annuals, with flat leaves. (Name composed of πολύς, *much*, and πωγών, *beard.*)

1. **P. monspeliénsis** (L.) Desf. Culms 2–6 dm. high, erect from a decumbent base, usually tufted; blades linear, scabrous; *panicle* 3–10 cm. long, *dense, interrupted, pale, and soft silky,* often partly included in the uppermost sheath; spikelets 2.5–3 mm. long. — Waste places, Me., and southw., mostly near the coast. June–Sept. (Nat. from Eu.) Fig. 106.

106. P. monsp. Inflorescence × 1/5. Spikelet, floret, and glumes × 2.

34. CALAMOVÍLFA Hack.

Spikelets 1-flowered, awnless; callus densely bearded; glumes rather firm, unequal, acute; lemma 1-nerved, acute; palea as long as the lemma, broad, deeply furrowed between the strong nerves. — Rather tall rigid perennials, with horizontal rootstocks and loosely spreading panicles. (Name from κάλαμος, *a reed*, and *Vilfa*, a name applied to a genus of grasses by Adanson.)

1. **C. brevípilis** (Torr.) Hack. *Culms* 6–12 dm. high, *tufted*, from a *short* horizontal *rootstock;* the *basal sheaths indurated and keeled;* blades long, linear,

nearly flat or involute; *panicle* purplish, 1–2 *cm. long, pyramidal*, the slender branches ascending; *pedicels hairy at the summit; spikelets* 5 *mm. long; glumes shorter than the floret, mucronate; callus-hairs less than half the length of the scabrous lemma and palea, which are bristly-bearded along the keels.* (*Calamagrostis* Beck.) — Sandy swamps, pine-barrens of N. J. and N. C., rare.

107. C. longifolia. Spikelet with detached glumes × 2.

2. C. longifòlia (Hook.) Hack. *Culms solitary*, 6–18 dm. high, from *running rootstocks*, stout; sheaths usually pubescent, at least on the margins; leaves elongated, involute above and *tapering into a long thread-like point; panicle pale*, 1.5–4.5 *dm. long, narrow*, the slender smooth branches erect or ascending; *spikelets* 6–7 *mm. long; glumes acute, the second equal to or exceeding the floret; callus-hairs more than half the length of the smooth lemma and palea.* (*Calamagrostis* Hook.) — Sandy shores, Ont. to Rocky Mts., southw. to Ill. and Kan., and southwestw. July–Sept. Fig. 107.

35 CALAMAGRÓSTIS Adans. Reed Bent Grass

Spikelets 1-flowered; rhachilla prolonged behind the palea into a hairy bristle or pedicel; glumes subequal, usually longer than the floret; lemma awned on the back, usually from below the middle, surrounded at base with copious long hairs; palea shorter than the lemma, faintly 2-nerved. — Tall often reed-like perennials, with running rootstocks, simple mostly erect culms and many-flowered panicles. (Name compounded of κάλαμος, *a reed*, and ἄγρωστις, *a grass*.) A difficult genus in which the awns and callus-hairs, although furnishing the most used diagnostic features, are exceedingly variable.

Awn bent, exserted more or less.	
Sheaths not bearded at the summit	1. *C. Pickeringii.*
Sheaths bearded at the summit.	
Palea about as long as the lemma; callus-hairs one fourth to one third as long	2. *C. Porteri.*
Palea and callus-hairs three fourths as long as the lemma	3. *C. perplexa.*
Awn straight, included.	
Panicle loose and open, even after flowering.	
Spikelets 3–3.5 mm. long	4. *C. canadensis.*
Spikelets 5–6 mm. long	5. *C. Langsdorfii.*
Panicle contracted, strict, the short branches erect or appressed after flowering.	
Rudiment hairy throughout.	
Panicle dense, more or less spike-like; leaves involute.	
Leaves smooth, soft; rootstock slender	6. *C. neglecta.*
Leaves roughish, rigid; rootstocks stouter	7. *C. hyperborea.*
Panicle looser, the branches spreading at flowering time	8. *C. inexpansa.*
Rudiment with copious long hairs at the tip	9. *C. cinnoides.*

* *Awn strongly bent, exserted more or less; callus-hairs usually much shorter than the lemma.*

1. C. Pickeríngii Gray. *Culms* solitary or few, 3–5 *dm. high*, somewhat rigid, scabrous below the panicle; sheaths smooth; *blades flat*, 4–10 *cm. long*, 4–5 mm. wide, erect; panicle purplish, 7–12 cm. long, the branches erect or ascending; spikelets 4 mm. long; glumes acute, exceeding the obtuse scabrous lemma, which bears a *short stout bent* (*not twisted*) *awn* from below the middle; callus-hairs $\frac{1}{3}$–$\frac{1}{4}$ the length of the lemma, wanting at the back. (*C. breviseta* Scribn.) — Mts. of N. Y. and N. E. to Nfd., and northw.; locally at Andover, Mass. (*J. Robinson*). Aug.–Sept.

Var. lacústris (Kearney) Hitchc. Culms taller (5–10 dm. high); rootstocks stouter; leaves more or less involute; panicle usually longer; callus-hairs $\frac{1}{2}$–$\frac{2}{3}$ as long as the lemma. — Mts. of N. E., and along the Great Lakes to Minn.

2. C. Portèri Gray. *Culms* slender, 6–12 *dm. high; blades* 1.5–3 *dm. long*, 4–8 mm. wide, flat, *taper-pointed, very rough, bearded on the sides at the base*; ligule 4–5 mm. long; *panicle narrow*, 8–16 cm. long, *rather loosely flowered, the*

short branches erect; spikelets 4–5 mm. long; *glumes acute*, slightly exceeding the floret; lemma obscurely dentate, *awn twisted below;* palea about as long as the lemma, callus-hairs scanty, $\frac{1}{4}$–$\frac{1}{3}$ as long. — Dry woods, N. Y. and Pa. Aug.

3. **C. perpléxa** Scribn. Similar to the preceding, slightly glaucous; *panicle oblong-lanceolate*, contracted, 1–1.5. dm. long, *the slender fascicled branches erect or ascending, densely flowered;* spikelets 3.5–4 mm. long; *glumes acuminate;* awn slightly twisted below; *palea and copious callus-hairs* $\frac{3}{4}$ *the length of the lemma.* (*C. nemoralis* Kearney, not Philippi.) — Rocky woods, Me. and w. N. Y., local.

* * *Awn straight or nearly so, included; callus-hairs usually not much shorter than the lemma.*

← *Panicle loose and open, even after flowering; the mostly purple-tinged or lead-colored strigose-scabrous glumes not closing in fruit, copious callus-hairs about equaling the lemma, not surpassed by those of the rudiment; awn delicate.*

4. **C. canadénsis** (Michx.) Beauv. (Blue-joint Grass.) Culms 6–15 dm. high, clustered; leaves 1.5–4 dm. long, flat, involute in drying, glaucous; panicle 1–3 dm. long, the slender fascicled branches ascending or spreading; *spikelets 3–3.5 mm. long;* glumes equal, acute, scarcely exceeding the thin erose-truncate lemma; *awn inconspicuous;* callus-hairs copious, about as long as the floret. — Wet places, e. Que. to N. J., and westw. June, July. Fig. 108. Var. acuminàta Vasey. *Glumes 4–5 mm. long, attenuate, exceeding the acute lemma*; awn less delicate and longer. — Lab., Nfd.; White Mts., N. H.; Roan Mt., N. C.; and in Rocky Mts.

108. C. canadensis. Spikelet × 3.

5. **C. Langsdórfii** (Link) Trin. Similar to the preceding; panicles usually smaller; *spikelets 5–6 mm. long; glumes acuminate*, somewhat exceeding the dentate lemma; *awn as long as the floret*, less delicate than in *C. canadensis.* — Moist meadows, Lab., mts. of N. E., L. Superior, and northwestw. Aug. (Greenl., Eurasia.)

← ← *Panicle contracted, strict, its short branches appressed or erect after flowering; the scabrous glumes mostly closed; lemma less delicate, sometimes as firm in texture as the glumes; awn stouter.*

6. **C. neglécta** (Ehrh.) Gaertner, Meyer & Scherbius. *Rootstock slender; culms slender*, 4–6.5 dm. high; *leaves soft*, 1–3 cm. long, *smooth;* panicle narrow, glomerate and lobed, 5–10 cm. long; spikelets about 4 mm. long; glumes acute; callus-hairs a little shorter than the floret, and as long as those of the rudiment; awn from the middle of the thin lemma or lower, barely exceeding it. (*C. stricta* Man. ed. 6, not Trin.) — Wet shores and mountains, n. N. E., L. Superior, northw. and westw. (Eurasia.)

7. **C. hyperbòrea** Lange. Culms and rootstocks stouter than in the preceding; culms tufted, 4–10 dm. high; *leaves involute, rigid, roughish;* panicles 7–15 cm. long, dense; spikelets 4–4.5 mm. long; glumes acute, exceeding the floret; callus-hairs $\frac{2}{3}$–$\frac{3}{4}$ as long as the lemma. (*C. lapponica* Man. ed. 6, not Hartm.) — Moist meadows and calcareous cliffs, Greenl. to Alaska, s. to e. Que., n. Vt., "Pa.," Minn.; and in the Rocky Mts.

109. C. inexpansa. Spikelet with detached glumes × 2.

8. **C. inexpánsa** Gray. Culms solitary or few, slender, 7–12 dm. high; leaves 1.5–3 dm. long, 3–5 mm. wide, scabrous above, flat, often involute in drying; *panicles pale*, 1–2 dm. long, *less densely flowered than others of this group*; spikelets 4 mm. long; *glumes rather rigid, sharp-pointed, about* $\frac{1}{4}$ *longer than the toothed lemma;* awn scarcely exceeding the lemma; callus-hairs $\frac{1}{4}$–$\frac{1}{3}$ shorter than the lemma. (*C. confinis* Man. ed. 6, not Nutt.) — Swamps and low prairies, N. Y. and N. J.; Minn. to Mo. and westw. July. Fig. 109.

110. C. cinnoides. Spikelet with detached glumes × 3.

9. **C. cinnoìdes** (Muhl.) Barton. Glaucous; culms stout, 1-1.8 m. high, solitary or few, erect or leaning; leaves very scabrous, sometimes sparingly hirsute, 1.5–3 dm. long, 5–10 mm. wide (those of the innovations shorter, narrow); panicles 8–17 cm. long, tapering to summit, usually much contracted; *spikelets 6–7 mm. long; glumes keeled*, very scabrous, *acuminate-aristate, the tips usually curved outward, exceeding the acuminate lemma* which is awned above the middle; *callus-hairs about ½ the length of the floret, those of the rudiment copious, confined to the tip*, almost equaling the lemma. (*C. Nuttalliana* Steud.) — Moist ground, Me. to O. and southw. FIG. 110.

36. AMMÓPHILA Host

Spikelets 1-flowered, large, awnless, crowded in a long spike-like panicle; rhachilla prolonged behind the palea into a hairy bristle; glumes firm, subequal, compressed-keeled, acute; lemma of like texture, surrounded at base with short hairs, 2-toothed at the apex and mucronate between the teeth; palea nearly as long, rather firm, the two nerves close together. — A coarse perennial with creeping rootstocks, rigid culms and involute leaves. (Name from ἄμμος, *sand*, and φιλεῖν, *to love*.)

111. A. arenaria. Inflorescence × 1/10. Spikelets × 1.

1. **A. arenària** (L.) Link. (SEA SAND-REED, PSAMMA, MARRAM, BEACH GRASS.) Culm stout, 0.5–1 m. high, branching at the base, from firm running rootstocks; leaves long, soon involute; panicle 1–4 dm. long; spikelets compressed; glumes and lemma scabrous. (*A. arundinacea* Host.) — Sandy beaches, along the coast, N. B. to N. C.; and on the Great Lakes. Aug., Sept. (Eu.) — An important sand-binder. FIG. 111.

37. APÈRA Adans.

112. A. spica-venti. Spikelet with detached glumes × 3.

Spikelets 1-flowered; rhachilla prolonged behind the palea into a minute naked bristle; glumes thin in texture, subequal, and slightly exceeding the lemma which bears a slender awn from just below the apex; palea nearly as long as the lemma, 2-toothed. — Annuals with flat leaves and diffuse panicles. (Name from ἄπηρος, *unmaimed*; application obscure.)

1. **A. SPÌCA-VÉNTI** (L.) Beauv. Culms slender, 3–7 dm. high, tufted, erect or geniculate at the lower nodes; blades linear; panicle 1–3.5 dm. long, the very slender branches verticillate, spikelet-bearing near the ends; spikelets 2 mm. long, shining; lemma scabrous, awn 5–7 mm. long. — Sparingly naturalized eastw. June, July. (Nat. from Eu.) FIG. 112

38. CÍNNA L. WOOD REED GRASS

Spikelets 1-flowered; rhachilla articulated below the glumes, forming a short naked stipe below the floret, and prolonged behind the palea into a minute bristle; glumes narrow, hispidulous on the keel; lemma 3–5-nerved, with a short awn from between the minute teeth of the bifid apex; palea 1-nerved, or 2-nerved, the nerves close together; stamen 1. — Tall perennials with flat leaves, conspicuous hyaline ligules, and many-flowered nodding panicles. (From κίννα, a name used by Dioscorides for a kind of grass.)

1. **C. arundinàcea** L Culms 0.5–1.5 m. high, erect, solitary or few together; *blades 2–3 dm. long, 1 cm. or less wide* (rarely wider), slightly scabrous; panicle

1.5–3 dm. long, the *slender branches ascending, somewhat contracted after flowering; spikelets* 5 *mm. long;* glumes scabrous, unequal, the second as long as the scabrous lemma which bears a minute awn or is sometimes awnless; *palea* 1-*nerved.* — Moist woods and shaded swamps; N. S. to Ont. and southw. Aug., Sept. Fig. 113.

113. C. arundinacea. Spikelets × 2½.

2. C. latifòlia (Trev.) Griseb. Similar to the preceding; *blades* 1.5–2.5 *dm. long,* 1–1.5 *cm. wide,* rarely narrower, scabrous; panicle 1.5–3.5 dm. long, *the flexuous capillary branches spreading or drooping; spikelets* 4 *mm. long;* glumes scabrous, subequal, and about equaling the scabrous short-awned lemma; *palea* 2-*nerved,* the nerves close together. (*C. pendula* Trin.) — Damp woods, Nfd. to B. C., s. to N. E., N. Y., the Great Lake region, and westw.; also on mts. of N. C. (Eu.)

39. AÌRA L. Hair Grass

Spikelets 2-flowered, both flowers perfect; glumes thin, somewhat scarious, subequal, acute, awnless, longer than the approximate florets; lemmas bidentate, awned on the back or the lower awnless; palea a little shorter than the lemma; grain included in the slightly indurated lemma and palea, and usually adherent to them. — Delicate annuals. (An ancient Greek name for Darnel.)

1. A. caryophyllèa L. Culms solitary or few, slender, erect, 8–30 cm. high; blades short, setaceous; panicle open, the silvery shining *spikelets clustered toward the ends of the spreading capillary branches,* 3 *mm. long,* nearly as broad; *lemma of both florets with a geniculate awn* 3–4 *mm. long from below the middle, the teeth of the apex setaceous.* — Waste places, Nantucket to O., and southw. June. (Nat. from Eu.) Fig. 114.

114. A. caryophyllea. Spikelet × 3. Flower × 4½.

2. A. capillàris Host. Similar to the preceding; panicle more diffuse; *spikelets scattered at the ends of the branches,* 2.5 mm. long; *lemma of lower floret awnless or with a minute awn just below the apex, the teeth of which are short;* lemma of upper floret bearing a geniculate awn 3 mm. long from below the middle, teeth of apex setaceous. — On the coast, Va., and southw. May, June. (Nat. from Eu.)

3. A. praècox L. Culms tufted, 0.5–20 cm. high, slender, erect or lower nodes geniculate; sheaths slightly inflated; blades setaceous; *panicle narrow and dense, the short branches erect,* 1–3 *cm. long; spikelets yellowish,* shining, 3.5–4 *mm. long;* lemmas of both florets bidentate at apex, and bearing a geniculate awn 2–4 mm. long from below the middle, the awn of lower floret shorter than that of the upper. — Sandy fields, N. J. and Del. to Va. May–July. (Nat. from Eu.)

40. HÓLCUS L.

Spikelets 2-flowered, articulated below the glumes; the lower floret perfect, raised on a curved stipe, awnless; the upper floret staminate (rarely perfect), its lemma bearing a dorsal awn from below the apex; glumes thin, subequal, compressed, boat-shaped, longer than the florets; lemmas somewhat indurated, boat-shaped; paleas thin, nearly as long as the lemmas. — Perennials with flat leaves and densely flowered terminal panicles. (A name used by Pliny for a kind of grass, from ὁλκός, *attractive.*)

115. H. lanatus. Spikelet × 2½. Same opened × 2½

H. lanàtus L. (Velvet Grass.) *Entire plant grayish, velvety-pubescent;* culms erect, 3–6 dm. high; leaves 15 cm. long or less, rarely longer, 5–10 mm. wide; panicle purplish, 5–10 cm. long, narrow; spikelets 4 mm. long, nearly as broad; glumes villous, hirsute on the nerves, the second broader than the first, 3-nerved; lemmas ciliate at the apex; *awn of second floret hooklike.* — Moist meadows, N. S. to Ill., and southw. June, July (Nat. from Eu.) Fig. 115.

41. SPHENÓPHOLIS Scribn.

Spikelets 2–3-flowered, the pedicels jointed just below the glumes; rhachilla prolonged behind the upper palea in a slender pedicel, articulated between the florets, the glumes and lower floret with joint of pedicel tardily falling together; glumes subequal, exceeded by the uppermost floret, the first narrow, the second much broader, usually obovate, becoming subcoriaceous in fruit, 3-nerved; lemma chartaceous, nerves obscure, awnless or awned below the summit, awn usually straight or divergent; palea hyaline, narrowed toward the base; grain inclosed within the rigid lemma, free. — Slender perennials with usually flat leaves and narrow terminal panicles. (Name from *σφήν, a wedge*, and *φολίς, a scale*, referring to the broadly obovate or wedge-shaped second glume.) EATONIA Endlicher and later authors, not Raf.

Spikelets awnless or with the second floret short-awned; glumes dissimilar, the first linear, second obovate, becoming chartaceous.
- Panicle narrow, densely flowered; second glume as broad as long, subcucullate in fruit . . . . . 1. *S. obtusata.*
- Panicle lax, branches more or less spreading, at least in flower.
  - Glumes subequal, second broadly obovate, obtuse; florets obtuse, the second very scabrous . . . . . 2. *S. nitida.*
  - Glumes unequal, first shorter than the narrowly obovate second one; florets mostly acute, glabrous . . . . . 3. *S. pallens.*

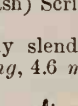
Spikelets awned; glumes similar.
- Lower floret usually awnless . . . . . 4. *S. palustris.*
- Both florets awned . . . . . (4) *S. palustris*, v. *flexuosa.*

1. **S. obtusàta** (Michx.) Scribn. Culms slender to rather stout, 3–10 dm. high; sheaths pubescent to nearly glabrous; leaves 4–15 cm. long, glabrous; panicle 6–18 cm. long, often glomerate; spikelets 2.5–3 mm. long; glumes subequal, the *second subcucullate, the broad chartaceous margins smooth and shining;* lemmas similar or the second a little scabrous. — Dry soil, Ct. to Fla., westw. to Mo. and Tex. June, July. FIG. 116. Var. PUBÉSCENS (Scribn. & Merr.) Scribn. Sheaths and sometimes culms and leaves pubescent. — Ct. to Mich. and southw. Var. LOBÀTA (Trin.) Scribn. *Sheaths and leaves scabrous*, not pubescent; panicle cylindrical, sometimes interrupted below; *spikelets densely crowded on the short appressed branches.* — Dry soil, and prairies, Me. to Fla., westw. throughout the U. S.; the commoner form in the North.

116. S. obtusata. Spikelet × 3.

2. **S. nítida** (Spreng.) Scribn. Culms slender, 3–6 dm. high; *sheaths pubescent; leaves 3–6 cm. long, 2–5 mm. wide, pubescent;* panicle 5–20 cm. long, loosely flowered, widely spreading in flower, finally erect; *spikelets* 3 mm. long, *cuneiform; glumes subequal, the broad second glume rounded or abruptly apiculate;* lemmas oblong, obtuse, rarely short-awned just below the apex, second lemma scabrous especially near the tip and keel. (*Eatonia Dudleyi* Vasey.) — Woods, Vt. to Mich., and southw. May, June. Var. GLÀBRA (Nash) Scribn. *Sheaths and leaves glabrous.* — Va., and southw.

3. **S. pállens** (Spreng.) Scribn. Culms 3–10 dm. high, usually slender; sheaths usually glabrous, sometimes pubescent; *leaves 5–20 cm. long, 4.6 mm. wide, scabrous on the nerves*, sometimes sparsely pilose above; panicles lax, nodding, 8–20 cm. long; spikelets 3–4 mm. long, *oblong-lanceolate; glumes unequal, scabrous on the keels*, the first linear, $\frac{1}{2}$–$\frac{3}{4}$ as long as the *broadly oblanceolate usually acute second glume; lemmas lanceolate, acute, glabrous* except on the keel near the apex, the second projecting beyond the second glume, sometimes awned below the apex. (*Eatonia pennsylvanica* Gray.) — Me. to N. C., w. to Wisc., Kan., and Tex. — In the Mississippi Valley this species occurs on prairies, and has a denser panicle; in the Atlantic States, especially southward, it occurs in meadows and along ditches, and has a more lax panicle. FIG. 117. Var. MÀJOR (Torr.) Scribn. *Panicles narrowly lanceolate or oblong, rather densely flowered*, the first glume nearly equaling the rather narrow second one. (*Eatonia intermedia* Rydh.) — Nfd. to Wash., s. to Ill., Col., and Ariz.



117. S. pallens. Spikelet × 3.

4. **S. palústris** (Michx.) Scribn. *Culms* 6–10 *dm. high;* sheaths and leaves glabrous, or lower sheaths sometimes pubescent; leaves 8–12 cm. long, 3–6 mm. wide, scabrous; *panicles* 10–20 *cm. long*, narrow; spikelets 6–7 mm. long; *glumes similar*, *lanceolate*, acute, subequal; lemmas lanceolate, the *first* acute or acuminate-pointed, *awnless*, *rarely short-awned;* the second bearing a slender divergent awn below the acute or 2-toothed apex; awn 4–5 mm. long. (*Trisetum pennsylvanicum* Man. ed. 6, not *Avena pennsylvanica* L.; *T. palustre* Trin.) — Low grounds, Mass. to Ill. and southw. Var. FLEXUÒSA Scribn. *Culms* 4–6 *dm. high; panicles* 8–12 *dm. long*, *open*, *the flexuous branches widely spreading at least in flower; spikelets* 4–5 *mm. long*, *the first floret usually awned.* — Del. (*Commons*), Pa. (*Heller*). FIG. 118.

118. S. pal., v. flex. Spikelet × 3.

42. KOELÈRIA Pers.

Spikelets 2–4-flowered; rhachilla prolonged into a naked pedicel behind the upper palea; glumes unequal, slightly shorter than the florets, membranaceous, acute, the first 1-nerved, the second 3-nerved; lemma chartaceous-membranaceous, the margins scarious, faintly 3–5-nerved, acute or mucronate; palea hyaline; grain loosely inclosed within the subrigid lemma, free. — Tufted perennials with narrow leaves and densely flowered terminal spike-like panicles. (Named for *Prof. G. L. Koeler*, an early writer on grasses.)

119. K. cristata × 2½. Spikelet. Lower part of lemma spread open.

1. **K. cristàta** (L.) Pers. Culms erect, 3–6 dm. high, leafy at the base; sheaths retrorsely pubescent, at least the lower; blades flat or becoming involute; panicle cylindrical, 4–15 cm. long, often interrupted at base, pale and shining; spikelets 4–5 mm. long; the glumes and lemmas scabrous. — Dry soil, Ont. and O. to B. C., and southw.; introduced in N. E. (Eurasia.) — Very variable. FIG. 119.

43. TRISÈTUM Pers.

Spikelets 2(rarely 3–5)-flowered, rhachilla prolonged behind the upper palea as a hairy bristle or pedicel; glumes unequal, the second about as long as the florets, keeled; lemma membranaceous, keeled, 2-toothed at the apex, bearing a slender dorsal awn; palea narrow, 2-toothed; grain smooth, inclosed in the lemma and palea but free from them. — Tufted perennials with narrow or spike-like or loose terminal panicles. (Name from *tres*, three, and *seta*, a bristle.)

120. T. spicatum × 3. Spikelet and floret.

1. **T. spicàtum** (L.) Richter. Culms slender, erect, 1.5–6 dm. high; sheaths and blades more or less puberulent, blades 2–10 cm. long, 1–3 mm. wide; *panicle* shining, *spike-like*, 3–12 cm. long, often interrupted below; *spikelets* 5–6 *mm. long;* the second glume broader than the first, 3-nerved; lemma minutely scabrous, the *awn inserted about* ⅓ *below the acuminate-toothed apex*, 4–5 *mm. long*, *divergent.* (*T. subspicatum* Beauv. and var. *molle* Gray.) — Mts. and rocky banks, Lab. to Alaska, s. to Ct., N. Y., the Great Lakes; and along the mts. to N. C. (Eurasia.) FIG. 120.

121. T. mel., v. maj. × 2. Spikelet and floret.

2. **T. melicoìdes** (Michx.) Vasey. Culm 3–8 dm. high; sheaths and blades roughish; *panicle* shining, *lax*, *nodding*, 10–12 cm. long; *spikelets* 7 *mm. long;* callus hairy; *lemma* minutely scabrous, *bluntly 2-toothed at the apex*, *awn* 1–2 *mm. long*, *straight*, *erect.* (*Graphephorum* Desv.) — Gulf of St. Lawrence to the Great Lakes, s. to N. B., Me., and Vt. Var. MÀJUS (Gray) Hitchc. Lower sheaths pubescent; upper surface of the leaves pilose; *lemmas*

entire at the acute apex, awnless. (*Dupontia Cooleyi* Gray; *Graphephorum melicoides*, var. *major* Gray.) — Gravelly or rocky shores, Me., Vt., Ont., and Mich Fig. 121.

44. DESCHÁMPSIA Beauv.

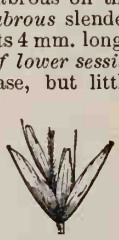
Spikelets 2(rarely 3)-flowered; rhachilla hairy, prolonged behind the upper palea as a hairy bristle; glumes subequal, thin or scarious; lemmas thin, 4-nerved (the midnerve becoming an awn), truncate, 2–4-toothed, bearing a slender dorsal awn from or below the middle. — Tufted perennials (our species) with flat or involute leaves and shining spikelets in loose or narrow panicles. (Named for *Loiseleur-Deslongchamps*, a French botanist, 1774–1849.)

122. D. flexuosa. Part of panicle × ½. Spikelet and floret × 2½.

* *Glumes somewhat shorter than the florets.*

1. **D. flexuòsa** (L.) Trin. (Common Hair Grass.) Culms erect, 3–8 dm. high, slender, nearly naked above, *the numerous involute-setaceous basal leaves* 5–20 cm. long; *sheaths scabrous; blades setaceous;* panicle 5–12 cm. long, very loose, rather few-flowered, the *smooth* capillary *flexuous branches* spikelet-bearing near the ends; spikelets 4–5 mm. long; *glumes acute; florets approximate, lemmas scabrous, 4-toothed*, awn inserted near the base, 5–7 mm. long, twisted; palea nearly as long as the lemma, scabrous. — Dry places, Nfd., Ont., Wisc., and northw., s. to N. C. and Tenn. June, July. (Eu.) Fig. 122.

2. **D. caespitòsa** (L.) Beauv. Culms erect, 6–12 dm. high, slender; *basal leaves flat or becoming involute, not setaceous*, 5–15 cm. long; *sheaths smooth; blades flat*, scabrous on the upper surface; panicle 10–20 cm. long, the *scabrous* slender *branches* spikelet-bearing near the ends; spikelets 4 mm. long; *glumes acute or blunt; florets distant* (*rhachilla half the length of lower sessile floret*); *lemmas smooth*, erose-truncate; *awn* from near the base, but little longer than its lemma, *straight, articulated at the base and deciduous;* palea nearly equaling the lemma. — Moist soil, mostly along streams, Nfd. to Alaska, s. to N. J. and Ill. June, July. (Eu.) — Spikelets rarely 3-flowered. Fig. 123.



123. D. caespitosa. Spikelet × 3½.

** *Glumes longer than the florets.*

3. **D. atropurpùrea** (Wahlenb.) Scheele. Culms erect, 1.5–5 dm. high, slender, leafy; *no tufts of basal leaves;* sheaths smooth; blades flat, 5–10 cm. long, 3–5 mm. wide, nearly glabrous; panicle 4–10 cm. long, rather few-flowered; the few smooth capillary flexuous branches spreading, sometimes drooping, spikelet-bearing at the ends; spikelets 5–6 mm. long; *glumes acuminate;* florets rather distant; lemmas strigose near the summit, erose-truncate and short-ciliate at apex; *awn inserted about the middle, bent*, 3–4 mm. long; palea nearly equaling the lemma. — Alpine summits of N. E. and N. Y. to Lab. and northwestw. July, Aug. (Eurasia.)

45. AVÈNA [Tourn.] L. Oat

Spikelets 2–6-flowered; rhachilla bearded below the florets; glumes subequal, membranaceous, many-nerved, longer than the lemmas, usually exceeding the uppermost floret; lemmas indurated except toward the summit, 5–9-nerved, bidentate at the apex, bearing a long dorsal twisted awn (the awn straight or wanting in cultivated forms); grain pubescent at least at the summit, often adhering to the lemma and palea. — Annuals or perennials with terminal panicles of large spikelets. (The classical Latin name.)

* *Spikelets more than 2 cm. long; annuals.*

1. **A.** FÁTUA L. Culms 4–12 dm. high, in small tufts, erect, stout; blades long, 5-8 mm. wide; *panicle loose and open*, the slender branches ascending; *spikelets pendulous*, 2.2–2.5 *cm. long*, excluding the awns; *glumes smooth, striate*, acuminate; florets approximate; lemmas with a ring of hairs at base and more or less appressed-pubescent with *long stiff brownish hairs;* awn inserted about the middle, bent and twisted, 3 cm. long or more. — Fields and waste places, Ont. and O. (rare); Wisc., Ill., and westw. (Nat. from Eu.) FIG. 124.

124. A. fatua. Spikelet × ⅔.

2. **A.** STÉRILIS L. (ANIMATED OATS.) Larger than the preceding, the *spikelets* 3.5–4.5 *cm. long*, excluding the awns; lemmas usually more densely hairy; *awns* 5–7 *cm. long.* — Occurs sparingly in N. J. and near Philadelphia, Pa. (Adv. from Eu.)

A. SATÌVA L., the cultivated oat, commonly occurs in waste places in cities, etc. (Introd. from Eurasia.)

* * *Spikelets less than* 1.5 *cm. long; perennials.*

3. **A.** PUBÉSCENS Huds. Culms 6–9 cm. high, in small tufts, erect, slender; *sheaths and blades*, at least the lower, *retrorsely pubescent;* panicle rather narrow, the slender flexuous branches erect; *spikelets upright*, 1.2–1.3 *cm. long*, excluding the awns; *glumes 3-nerved, the nerves scabrous;* florets approximate, rhachilla-joints clothed with long white hairs; *lemmas scabrous, a tuft of white hairs at the base*, a bent and twisted awn inserted about the middle, 2–2.5 mm. long. — Fields, Vt., N. J. (Adv. from Eu.)

46. ARRHENÁTHERUM Beauv. OAT GRASS

Spikelets 2-flowered, the florets approximate, the lower staminate, its lemma bearing a geniculate and twisted awn on the back near the base; the upper perfect, its lemma short-awned from or near the apex, or awnless; rhachilla hairy, prolonged behind the upper palea into a bristle; glumes unequal, acute, thin and scarious; lemmas of firmer texture, 5–7-nerved; palea ciliate on the nerves. — Tall perennials with flat leaves and long narrow panicles. (Name from ἄρρην, *masculine*, and ἀθήρ, *awn*, in reference to the awned staminate floret.)

125. A. elatius. Spikelet with glumes detached × 2.

1. **A.** ELÀTIUS (L.) Beauv. (TALL O.) Culms 1 m. or more high, erect; leaves long, linear, 0.5–1 cm. wide, scabrous on both surfaces; panicle pale or purplish and shining, 15–30 cm. long, narrow, the short branches verticillate, usually spikelet-bearing from the base; spikelets 7–8 mm. long; glumes minutely scabrous, the second about equaling the florets; lemmas scabrous, the awn of the staminate floret about twice the length of its lemma; paleas as long as their lemmas. (*A. avenaceum* Beauv.) — Meadows and waste places, Nfd. to Va., Ont., Minn., etc.; often cultivated. June, July. (Nat. from Eu.) FIG. 125.

47. DANTHÒNIA DC. WILD OAT GRASS

Spikelets several-flowered; florets not closely approximate, uppermost imperfect or rudimentary; glumes subequal, much longer than the lemmas, usually exceeding the uppermost floret; lemma convex, 2-toothed or bifid at the apex, with a twisted awn between the teeth; awn flat, formed by the extension of the 3 middle nerves of the lemma. — Tufted erect perennials with narrow leaves and small terminal panicles or racemes. (Named for *Étienne Danthoine*, a botanist of Marseilles.)

Teeth of the lemma triangular, not aristate . . . . . 1. *D. spicata.*
Teeth of the lemma aristate.
  Florets not over 5 mm. long . . . . . 2. *D. compressa.*
  Florets 7–8 mm. long.
    Spikelets nearly sessile, in small crowded panicle, purple . . . . 3. *D. intermedia.*
    Spikelets in loose panicle, pale green.
      Sheaths and blades villous; lemma silky-hairy . . . . . 4. *D. sericea.*
      Sheaths and blades glabrous; lemma pubescent on margins and base only . . . . . 5. *D. epilis.*

1. **D. spicàta** (L.) Beauv. *Culms* 2–7 dm. high *terete;* sheaths and involute blades glabrous or sparsely pilose, the numerous basal leaves often curled, those of the culm erect; panicle few-flowered, the few short branches erect or ascending, often reduced to a raceme; spikelets 10–12 mm. long, on short stiff pedicels; glumes acuminate; lemmas 4–5 mm. long, sparsely clothed with stiff hairs, *teeth triangular*, the awn longer than the lemma. — Dry and sterile or rocky soil. June–Aug. Fig. 126.

126. D. spicata. Panicle × ½. Spikelet and floret × 1½. Lemma × 2.

2. **D. compréssa** Aust. Usually taller than the preceding; *culms flattened*, often decumbent at base; *leaves elongated, 2–3 mm. wide, flat or involute on the margins only;* panicle more open; *teeth of the lemma aristate, at least 2 mm. long.* — Dry woods, Me. to N. Y., and southw.

3. **D. intermèdia** Vasey. Culms 1–4 dm. high, with numerous mostly involute basal leaves; culm-leaves 5–15 cm. long, involute; *spikelets 15 mm. long, rather crowded in a raceme or simple few-flowered panicle; glumes broad, acuminate, purplish, with pale scarious margins; lemma* 7–8 mm. long, *glabrous except at the base and margins below the middle,* the teeth aristate; *awn* 7–8 *mm. long.* — Mt. Albert, Gaspé Co., Que.; n. Mich. (*Farwell*), and westw. July, Aug.

127. D. sericea Lemma × 4.

4. **D. serícea** Nutt. Culms 5–9 dm. high; *sheaths and blades villous*, at least the lower ones; basal blades elongated, mostly involute, those of culms flat or involute; *panicle* 6–10 *cm. long, rarely longer, rather loose*, the branches ascending or spreading; spikelets about 1.5 mm. long; *glumes narrow*, acuminate, *pale; lemma densely clothed with long silky hairs, the aristate teeth more than ⅓ the entire length of the lemma, awn* 12–15 *mm. long.* — Sandy soil, Mass. to Pa., and southw. Fig. 127.

5. **D. épilis** Scribn. Very similar to the preceding, not so tall; *sheaths and blades glabrous;* panicle smaller; *lemma glabrous, except at the base and on the margins below the middle.* (*D. glabra* Nash, not Philippi.) — Sandy soil, N. J., and southw., rare. May. — Possibly only a variety of the preceding.

48. SPARTÌNA Schreb. Cord or Marsh Grass

Spikelets 1-flowered, flattened laterally, sessile and closely imbricated in 2 rows along one side of a continuous rhachis, forming unilateral spikes which are scattered along a common axis; glumes unequal, keeled, acute or bristle-pointed, the second usually exceeding the obtuse thinner 1-nerved lemma; palea equaling or exceeding the lemma. — Coarse perennials with strong creeping rootstocks, rigid simple culms, and long tough leaves. (Whence the name, from σπαρτίνη, *a cord*, such as was made from the bark of the *Spartium* or broom.)

* *Culms stout, usually over* 1 *m. high; leaves* 1 *cm. or more wide, flat or nearly so when fresh.*

1. S. **Michauxiàna** Hitchc. (Slough Grass.) Culms 1–2 m. high; leaves 6–12 dm. long, 15 mm. wide or less, tapering to a very slender point,

keeled, flat, but quickly involute in drying, smooth except the margins; spikes 5–20, scattered, spreading, 0.5–10 cm. long; rhachis rough on the margins; *glumes* serrulate-hispid on the keel, the *first acuminate and equaling the floret, the second tapering into an awn 7 mm. long;* lemma 7–9 mm. long, glabrous except the serrulate-scabrous midnerve which abruptly terminates below the emarginate or 2-toothed apex. (*S. cynosuroides* Am. auth., not Roth.) — Banks of rivers and lakes, or on wet prairies, N. S. to Assina., s. to N. J. and Okla. Aug.–Oct. Fig. 128.

128. S. Michauxiana. Spikelet with glumes detached × 2.

2. **S. cynosuroìdes** (L.) Roth. (Salt Reed Grass.) Culms stout, 1–3 m. high, often 2 cm. in diameter near the base; leaves 1–2.5 cm. wide, flat or nearly so, roughish underneath as well as on the margins; *spikes* 20–50, *forming a dense oblong purplish raceme; glumes barely mucronate, the first* ½ *the length of the lemma*, of which the rough hispid *midrib reaches the apex.* (*S. polystachya* Willd.) — Salt and brackish marshes, Ct., and southw. Aug.–Oct. — Specimens from Dismal Swamp, Va., have only 10–15 spikes. Fig. 129.

129. S. cynosuroides. Spikelet with glumes detached × 2.

3. **S. glàbra** Muhl. (Salt Marsh Grass.) Culms 0.6–2.4 m. high, leafy to the top; leaves 5–7 dm. long, 1–1.5 cm. wide, usually flat, sometimes involute; *spikes appressed*, 5–15 cm. long, the *rhachis slightly projecting beyond the spikelets;* spikelets 10–14 mm. long; glumes glabrous or sparingly scabrous on the keel, the first scarcely ⅔ the length of the second; lemma 8–10 mm. long. (*S. stricta*, var. Gray.) — Salt marshes, Va., and southw. — Odor strong and rancid. Var. pilòsa Merr. has glumes with scabrous keels and *lemmas sparingly pilose*, thus approaching the European *S. stricta* Roth. — Mass., and southw. Fig. 130.

Var. **alterniflòra** (Loisel.) Merr. Spikes more slender, 7–12 cm. long, the *spikelets* somewhat remote, *barely overlapping*, the *rhachis continued into a more conspicuous bract-like appendage; lemma sparingly pilose;* otherwise as in the preceding form, into which it passes. (*S. stricta*, var. Gray.) — Lower St. Lawrence, and southw. (Eu.)

130. S. glabra, v. pilosa. Part of inflorescence × ½. Spikelet × 1½. Same displayed × 1½.

** *Culms slender, rarely 1 m. high; leaves not over 5 mm. wide, strongly involute when fresh.*

4. **S. pàtens** (Ait.) Mnhl. Culms slender, wiry, 3–8 dm. high, from long slender rootstocks; sheaths overlapping; blades 1–3.5 dm. long, *involute, spreading; panicle short-exserted or included at base*, of 2 to several *ascending spikes* (2–5 cm. long); rhachis smooth; spikelets 10–12 mm. long; first glume linear, mucronate, scarcely half as long as the lanceolate acuminate second glume, which is scabrous on the nerves; *lemma 5–6 mm. long, thin, obtuse, slightly emarginate;* palea slightly longer. — Salt marshes and sandy coasts, Nfd. and e. Que. to Va. July, Aug.

131. S. pat., v. junc. Spikelet with glumes detached × 2.

Var. **júncea** (Michx.) Hitchc. Differs from the species in its greater size, *culms 5–12 dm. high*, longer *erect or ascending leaves*, and *stouter rootstocks;* panicles exserted; *spikes nearly erect;* spikelets 7–10 mm. long. (*S. juncea* Willd.) — Salt marshes and sandy beaches along the coast, N. H. to Fla. and Tex. June–Sept. Fig. 131.

Var. **caespitòsa** (A. A. Eaton) Hitchc. Differs from the species in its *tufted habit, no creeping rootstocks*, taller culms, and *awned second glume;* blades approximate near the middle of the stem, glaucous above, as much as 6 dm. long, with long involute scabrous points. (*S. caespitosa* A. A. Eaton.) — Border of brackish marshes, N. H. and Mass.

49. BECKMÁNNIA Host

Spikelets 1-flowered in our species, broad, laterally compressed, closely imbricated in 2 rows along one side of a continuous rhachis, forming short unilateral spikes; rhachilla articulated below the glumes; glumes subequal, inflated, boat-shaped, chartaceous, margin scarious; lemma lanceolate, acuminate, palea nearly as long; grain free within the rigid lemma and palea. — A rather tall erect perennial, with flat leaves and a terminal elongated narrow nearly simple panicle. (Named for *Johann Beckmann*, 1739–1811, professor of botany at Goettingen.)

132. B. erucaeformis. Part of inflorescence × 1/5. Part of same × 1/2. Spikelets and floret × 2.

1. **B. erucaeformis** (L.) Host. Light green; culms 5–10 dm. high; sheaths loose, overlapping; blades 1–2.5 dm. long, 5–8 mm. wide, scabrous; panicle 1–2.5 dm. long, the spikes appressed; spikelets nearly circular, 3 mm. long; the glumes transversely wrinkled; the acuminate apex of the lemma protruding beyond the glumes. — Wet ground, Minn., Ia., and westw.; adv. in O. Fig. 132.

50. CÝNODON Richard. Bermuda or Scotch Grass

Spikelets 1-flowered, laterally compressed, awnless, singly sessile in 2 rows along one side of a slender continuous axis, forming unilateral spikes; rhachilla prolonged behind the palea into a blunt pedicel; glumes unequal, narrow, acute, keeled; lemma broad, boat-shaped, obtuse, ciliate on the keel; palea as long as the lemma, the prominent keels close together, ciliolate; grain free within the lemma and palea. — Low diffusely branched and extensively creeping perennials, with flat leaves and slender spikes digitate at the apex of the upright branches. (Name composed of κύων, *a dog*, and ὀδούς, *a tooth*.) Capriola Adans.

133. C. Dactylon. Inflorescence × 1/2. Spikelet × 4.

1. **C. Dáctylon** (L.) Pers. Glabrous; culms flattened, wiry; ligule a conspicuous ring of white hairs; spikes 4–5, 2–5 cm. long; spikelets imbricated, 2 mm. long; lemma longer than the glumes. (*Capriola* Ktze.) — Fields and waste places, Mass., and southw., where it is cultivated for pasturage. (Nat. from Eu.) — Seldom perfects seed. Fig. 133.

51. SCHEDONNÁRDUS Steud.

Spikelets 1-flowered, sessile and appressed, alternate and distant along one side of a slender triangular rhachis, forming very slender spikes; glumes narrow, unequal, with strong rigid keels, pointed, shorter than the lanceolate acuminate scabrous lemma; palea nearly as long as the lemma; grain free within the subrigid lemma and palea. — A low diffusely branching annual with short narrow leaves and slender paniculate spikes. (Name from σχεδόν, *near*, and *Nardus*, from its resemblance to that genus.)

134. S. paniculatus. Part of spike × 1¾. Spikelet × 3.

1. **S. paniculàtus** (Nutt.) Trel. Culms 3–5 dm. high, erect or decumbent at base, leafy below; sheaths and blades smooth; panicle half or more than half the entire height of the plant, its axis usually falcate, the spikes solitary and remote, mostly along the convex side, rigid; spikelets 4 mm. long. (*S. texanus* Steud.) — Open ground and salt licks, Ill. to Mont., Col., and Tex. — At maturity the panicle becomes much elongated and decumbent, the axis extending in a large loose spiral. Fig. 134.

52. GYMNOPÒGON Beauv

Spikelets with 1 perfect flower, sometimes 1 or 2 neuter or staminate subsessile florets above the perfect one, remote along one side of a filiform continuous rhachis, forming slender unilateral spikes; rhachilla prolonged beyond the floret as a slender often awned rudiment; glumes narrow, subequal, rigid, scabrous on the strong keel, equaling or exceeding the florets; lemma thin, bearing a slender straight awn from just below the apex; palea about as long as the lemma. — Perennials, with short rather broad rigid leaves and numerous slender spikes, at first erect, at length widely divaricate or reflexed. (Name composed of γυμνός, *naked*, and πώγων, *a beard*, alluding to the reduction of the abortive flower to a bare awn.)

135. G. ambiguus. Inflorescence × 1/5. Spikelet × 2½

1. **G. ambíguus** (Michx.) BSP. Culms tufted from a short rootstock, rigid, erect or ascending, 2–5 dm. high; sheaths overlapping, blades often approximate, thick, rigid, spreading, 4–6 cm. long, 1 cm. or more wide; *spikes* solitary or in 2's along a striate axis, becoming widely divaricate when exserted from the sheath, *spikelet-bearing to the base; awn of floret longer than the glabrous lemma; rudiment long-awned.* (*G. racemosus* Beauv.) — Sterile sandy or gravelly ground, N. J. to Mo., Fla., and Tex. Aug., Sept. Fig. 135.

2. **G. brevifòlius** Trin. Resembling the preceding; culms more slender, from a decumbent base; leaves 2–4 dm. long, 4–9 mm. wide, involute in drying; *spikes* usually less numerous, more distant, *naked at the base, spikelet-bearing from about the middle; awn shorter than the hairy lemma;* one or two sterile florets sometimes present, rudiment usually awnless. — Sandy ground, N. J., and southw.

53. CHLÒRIS Sw.

Spikelets with 1 perfect floret, sessile in 2 rows along one side of a continuous rhachis, forming unilateral spikes; rhachilla prolonged behind the palea and bearing 1 or more rudimentary awned sterile lemmas; glumes unequal, narrow, acute, keeled; lemma often ciliate on the back or margins, 1–3-nerved, the mid-nerve nearly always prolonged into a slender awn; palea about equaling the lemma; grain free within the lemma and palea. — Usually perennial grasses with flat leaves and digitate spikes. (Named for *Chloris*, the goddess of flowers.)

136. C. verticillata. Spikelet × 2.

1. **C. verticillàta** Nutt. Culms 1–4 dm. high, erect, or decumbent and rooting at the nodes; sheaths compressed; leaves obtuse, light green; spikes several in 1–3 whorls, slender, 5–10 cm. long; spikelets 3 mm. long, with awns about 5 mm. long; sterile lemma one. — Prairies, e. Kan. and southwestw. June. — At maturity the inflorescence breaks away and forms a tumbleweed. Fig. 136.

54. BOUTELOÙA Lag. Mesquite Grass

Spikelets 1–2-flowered, crowded and sessile in 2 rows along one side of a continuous flattened rhachis, which usually projects beyond the spikelets; rhachilla prolonged beyond the perfect floret and bearing a sterile (rarely staminate) floret, a second or third rudiment often present; glumes unequal, keeled; lemma broader, 3–5-nerved, 3–5-toothed or cleft, 3 of the divisions usually awn-pointed; palea about the length of the lemma, bidentate, the 2 keels scabrous; sterile floret sometimes reduced to the awns, rarely obsolete. — Our species perennial with narrow flat or convolute leaves, and unilateral spikes nearly sessile along a common axis. (Named for *Claudio Boutelou*, a Spanish writer upon floriculture and agriculture.)

§ 1. CHONDRÒSIUM (Desv.) Gray. *Spikes* 1–4, *usually curved, of* 25 *or more densely crowded pectinate spikelets.*

1. **B. oligostàchya** (Nutt.) Torr. Culms slender, erect, from a short rootstock, leafy at the base, 1.5–5 dm. high; sheaths and blades glabrous, the latter about 2 mm. wide, flat or becoming convolute; spikes 1–3, 2–5 cm. long; spikelets 5–6 mm. long; glumes narrow, the first about ½ as long as the *second*, which is *sparsely papillose-pilose on the keel;* fertile lemma pilose, 3-cleft, the divisions awned; sterile lemma consisting of 2 truncate lobes and 3 divergent equal awns with a *tuft of long hairs at base*, second rudiment obtuse, awnless. — Prairies, Wis. and N. Dak. to Tex.; casual eastw. (Mex.) July–Sept. Fig. 137.

137. B. oligostachya. Spikelet with glumes detached × 3.

2. **B. hirsùta** Lag. Culms tufted, erect, 2–5 dm. high, leafy at the base; sheaths smooth; *blades* about 3 mm. wide, flat, *sparsely papillose-hairy, especially on the margins;* spikes 1–4, 1.5–5 cm. long; the *rhachis of the spike produced into a prominent point beyond the uppermost spikelets;* spikelets about 5 mm. long; first glume setaceous, the *second* equaling the floret, *conspicuously tuberculate-hirsute on the back;* fertile lemma pubescent, 3-cleft, the divisions awn-pointed; sterile floret of 2 obtuse lobes and 3 equal awns margined below, *no tuft of hairs at the base.* — Sandy plains, Wis. to Mo., and southwestw. to Mex. July–Sept. Fig. 138.

138. B. hirsuta. Spikelet with glumes detached × 3.

§ 2. ATHEROPÒGON (Muhl.) Gray. *Spikes* 15 *or more, of* 12 *or fewer ascending spikelets.*

3. **B. curtipéndula** (Michx.) Torr Culms erect from short running rootstocks, 3–10 dm. high; sheaths pubescent toward the summit; blades 1–3 dm. long, 3–5 mm. wide, flat or involute and setaceous toward the end, scabrous above, sometimes pubescent beneath; *spikes numerous*, 8–16 mm. long, spreading or reflexed, in a long mostly 1-sided raceme, *the rhachis bifid at the extended apex;* spikelets 7–10 mm. long; first glume less than ½ the length of the second which is very scabrous on the thickened keel, exceeding the floret; *lemma scabrous*, ending in 3 short slender awns; teeth of palea aristate; *sterile lemma with 2 acute lobes and 3 straight awns, the lateral ones much shorter than the middle awn.* (*B. racemosa* Lag.) — Dry hills and plains, Ct. to Minn., s. to Tex. and Mex. July–Sept. — The sterile lemma variable, rarely reduced to a single awn. Fig. 139.

139. B. curtipendula. Part of inflorescence × ½.

55. CTÉNIUM Panzer. Toothache Grass

Spikelets with 1 perfect flower and 2–5 sterile lemmas, crowded and sessile, pectinate in 1-sided spikes; glumes very unequal, first minute, second nearly as long as the spikelet, bearing a stout horizontally divergent dorsal awn from about the middle; first and second lemmas empty or sometimes with a hyaline palea, awned below the apex, awn erect or ascending; third lemma similar, containing a perfect flower; fourth awnless, staminate or empty; a fifth rudimentary lemma often present. — Rather tall perennials with solitary terminal more or less curved spikes. (Name from κτενίον, *a small comb*, from the pectinate appearance of the spike.) Campulosus Desv.

140. C. aromaticum Inflorescence × ½. Spikelet × 2. Same with glumes detached × 2.

1. **C. aromáticum** (Walt.) Hitchc. Culms 1–1.5 m. high, erect, from scaly rootstocks, old sheaths persistent at the base; blades long, flat or involute, stiff; spike 0.5–1.5 dm.

long; spikelets 5–7 mm. long; first glume warty-tuberculate on the nerves; florets stiffly ciliate on the margins. (*C. americanum* Spreng.)—Wet pine barrens, Va., and southw.—Taste very pungent. Fig. 140.

56. DACTYLOCTÈNIUM Willd. Crowfoot Grass

Spikelets several-flowered, the uppermost imperfect, sessile and crowded in 2 rows along one side of a continuous rhachis, which extends beyond the spikelets in a naked point; glumes broad, keeled; lemmas boat-shaped, cuspidate; palea equaling the lemma, acute, deeply folded between the ciliate-winged keels; grain reddish brown, the loose pericarp transversely wrinkled.—Annual, with more or less decumbent and creeping base, and 2–6 stout unilateral spikes digitate at the apex of the culm. (Name from δάκτυλος, *finger*, and κτενίον, *a little comb*, alluding to the digitate and pectinate spikes.)

141. D. aegyptium. Inflorescence × ½. Spikelet × 2. Fruit × 3. Seed × 4

1. D. aegýptium (L.) Richter. Usually glabrous; culms rooting at the lower nodes; spikes 1.5–5 cm. long; glumes scabrous on the keel, the second cuspidate; the awned tip of lower lemma inflexed, that of the others straight or curved. (*D. aegyptiacum* Willd.; *Eleusine aegyptia* Pers.)—Yards and cultivated fields, N. Y., Ill., and southw. (Nat. from tropics of the Old World.) Fig. 141.

57. ELEUSÌNE Gaertn. Goose Grass. Yard Grass

Spikelets several-flowered, awnless, florets perfect or uppermost staminate, sessile and closely imbricated in 2 rows along one side of a continuous rhachis, which does not extend beyond the terminal spikelet; glumes unequal, shorter than the floret, scabrous on the keels; lemmas broader, with a thickened 5-ribbed keel; palea shorter, acute, the narrowly winged keels distant; grain black, the loose pericarp marked with comb-like lines, free within the subrigid lemma and palea.—Coarse tufted annuals with stout unilateral spikes digitate or approximate at the apex of the culms. (Name from Ἐλευσίν, the town where Ceres, the goddess of harvests, was worshiped.)

142. E. indica. Part of inflorescence × ½. Spikelet and floret × 2. Fruit and seed × 4.

1. E. índica Gaertn. Glabrous; culms flattened, decumbent at base; sheaths loose, overlapping, compressed; spikes 2–10, 2.5–8 cm. long; spikelets appressed, 3–5-flowered, about 5 mm. long.—Yards and waste ground, Mass., n. Ill., Kan., and southw. (Nat. from tropics of the Old World.) Fig. 142.

58. LEPTÓCHLOA Beauv.

Spikelets 2–several-flowered, the uppermost floret usually imperfect or rudimentary, sessile or nearly so, in 2 rows along one side of the slender continuous rhachis; glumes and lemmas keeled, the latter 3-nerved, acute, awnless or short-awned, exceeding the palea.—Usually tall annuals with flat leaves and elongated simple panicles composed of the numerous very slender spikes scattered along the main axis. (Name composed of λεπτός, *slender*, and χλόα, *grass*, from the long attenuated spikes.)

143. L. filiformis. Inflorescence × 1/10. A part of same with 2 spikelets × 1½. Spikelet and floret × 3.

1. L. filifórmis (Lam.) Beauv. Culms 4–12 dm. high; *sheaths papillose-hairy;* spikes 20–40, 5–10 cm. long, ascending; spikelets about 3 mm. long; *glumes* more or less mucronate, *nearly equaling the* 3–4 *awnless florets.* (*L. mucronata* Kunth; *L. attenuata* Steud.)—Fields, Va. to Ill., Mo., and southw. Aug. Fig. 143.

2. **L. fasciculàris** (Lam.) Gray. *Smooth;* leaves longer than the erect or geniculate-decumbent and branching culms, the upper sheathing the base of the panicle; spikes 8–12 cm. long; spikelets slightly pediceled, 7–11-*flowered, the florets much longer than the lanceolate glumes;* lemmas hairy-margined toward the base, with 2 small lateral teeth and a short awn in the cleft of the apex. (*Diplachne* Beauv.; *D. acuminata* and *procumbens* Nash.) — Brackish meadows, from Mass. southw. along the coast; and from Ill. southw. along the Miss. R. Aug., Sept.

59. BÙCHLOË Engelm. Buffalo Grass

Spikelets unisexual; plants monoecious or dioecious; staminate spikelets 2–3-flowered, sessile in 2 rows along the short 1-sided spikes; glumes unequal, obtuse; lemmas larger, 3-nerved; palea a little shorter than the lemma; pistillate spikelets 1-flowered, in nearly capitate 1-sided spikes which are scarcely exserted from the broad sheaths of the upper leaves; glumes indurated, trifid at the apex, united at base and resembling an involucre; lemma narrow, hyaline, inclosing the 2-nerved palea; grain free within the hardened glumes. — A creeping or stoloniferous perennial with narrow flat leaves, and dissimilar staminate and pistillate spikelets borne on the same or on distinct plants. (Name strongly contracted from βούβαλος, *buffalo*, and χλόη, *grass*.)

144. B. dactyloides. ♂ and ♀ inflorescence × ½. ♂ Spikelet and floret (above) × 1½. ♀ Spikelet, section of same, and outer glume × 1½.

1. **B. dactyloides** (Nutt.) Engelm. Culms of the staminate inflorescence 1–3 dm. high; the spikes long-exserted; culms of pistillate inflorescence low, much exceeded by the leaves; sheaths overlapping; blades 2 mm. wide or less; staminate spikes 2 or 3, 6–12 mm. long; cluster of pistillate spikelets ovoid, 6 mm. long. (*Bulbilis* Raf.) — Plains of the Sask. to Minn., Kan., and Tex. — One of the most valuable grasses of the plains. Seedlings are monoecious, but the staminate and pistillate branches propagate their own kind. Fig. 144.

60. PHRAGMÌTES Trin. Reed

Spikelets loosely 3–7-flowered; rhachilla clothed with long silky hairs; glumes unequal, lanceolate, acute; lemmas narrow, long-acuminate, that of the lowest floret somewhat longer, equaling the uppermost florets, empty or subtending a staminate flower, the other florets perfect; paleas ½–⅔ the length of their lemmas. — Tall reed-like perennials with stout leafy culms and large terminal panicles. (Name from φραγμίτης, *growing in hedges*, apparently from its hedge-like growth along ditches.)

145. P. communis. Spikelet, ☿ and ♂ floret × 1½.

1. **P. communis** Trin. Culms erect, stout, 1.5–4 m. high, from long creeping rootstocks; sheaths overlapping; blades 1.5–6 dm. long, 1–5 cm. wide, flat, glabrous; panicle tawny, 1.5–4 dm. long, branches ascending, rather densely flowered; spikelets 12–15 mm. long; the florets exceeded by the hairs of the rhachilla. (*P. vulgaris* BSP.; *P. Phragmites* Karst.) — In wet places, edges of ponds, ditches, etc. — Rarely perfecting seed, spreading freely from the rootstocks, the leafy stolons often running on the surface of the ground for a distance of 5–10 m. (Eurasia.) Fig. 145.

Arúndo Dònax L., the Giant Reed, is cultivated for ornament and is occasionally spontaneous southward. Resembling *Phragmites* but taller, spikelets 3–4-flowered; flowers all perfect; *rhachilla naked; lemmas clothed with long silky hairs, short-awned from the bifid apex.*

61. TRÌDENS R. & S.

Spikelets 3–12-flowered in open or strict panicles; florets perfect or the uppermost staminate; glumes unequal, keeled, shorter than the spikelet; lemma subcoriaceous, convex below, bidentate, 3-nerved, the nerves silky-villous below and at least the middle one extending in a mucronate point between the teeth; palea broad, the nerves nearly marginal. — Perennials with long narrow leaves and terminal panicles. (Name from *tres*, three, and *dens*, tooth.) TRIODIA R. Br.

146. T. flavus × 2. Spikelet. Same displayed. Lemma unrolled.

1. **T. flàvus** (L.) Hitchc. (TALL RED TOP.) Culms erect, 1–2 m. high, viscid in the axis of the panicle and below it; sheaths bearded at the summit, otherwise glabrous as are the long flat or involute tapering blades; the *showy panicles* 2–4.5 *dm. long, almost as wide, loose and open, the slender branches spreading, naked below; spikelets purple*, 7–8 mm. long, 5–8-flowered, on long pedicels; *glumes shorter than the lowest florets, mucronate; the three nerves of the lemmas excurrent.* (*Poa flava* L.; *Triodia seslerioides* Benth.; *T. cuprea* Jacq.) — Dry or sandy fields, Ct. to Mo., and southw. Aug., Sept. FIG. 146.

2. **T. stríctus** (Nutt.) Nash. Caespitose, 12–14 dm. high; culms stout, erect; leaves long and rigid; *panicle* pale or purplish, *dense and spike-like*, 1–3 *dm. long; spikelets* about 5 mm. long, 5–8-flowered, *nearly sessile; glumes exceeding the lower florets*, mucronate; *only the midnerve of the lemma excurrent.* (*Triodia stricta* Benth.) — Moist soil, s.e. Kan., and southw. July–Sept.

62. TRÍPLASIS Beauv.

Spikelets 3–6-flowered, the florets remote, the lowest stipitate, perfect or the uppermost staminate; glumes unequal, keeled, shorter than the florets; lemmas 2-cleft, the 3 nerves strongly ciliate, the midnerve excurrent as a short awn between the lobes; palea shorter, broad, the nerves nearly marginal and densely long-ciliate from the middle to the apex. — Perennials with small nearly simple panicles. (Name from τριπλάσιος, *thrice as many.*)

147. T. purpurea × 2. Spikelet and lemma.

1. **T. purpùrea** (Walt.) Chapm. (SAND GRASS.) Culms tufted, widely spreading or ascending, wiry, 3–8 dm. long, nodes bearded; sheaths and the small rigid blades scabrous; terminal panicles 3–7 cm. long, the few stiff branches finally divergent; smaller panicles (partially hidden in the sheaths) produced at the nodes late in the season; spikelets short-pediceled, usually rose-purple, 5–8 mm. long; the awn of the lemma scarcely exceeding the truncate lobes. (*Tricuspis* Gray; *Triodia* Hack.) — In sand, Me. to Va., along the coast, and southw.; also along the Great Lakes and southwestw. Aug., Sept. — Plant acid to the taste. FIG. 147.

63. ERAGRÓSTIS Beauv.

Spikelets strongly compressed, 3–many-flowered; the uppermost floret sterile; rhachilla articulated but sometimes not disjointing until after the fall of the glumes and lemmas with the grain; glumes keeled, much shorter than the spikelets; lemmas 3-nerved, broad, keeled; paleas shorter than their lemmas, often persistent after their fall, the strong nerves ciliate. Annuals or perennials with loose or dense terminal panicles. (Name from ἦρ, *spring*, and ἄγρωτις, *a grass.*)

Annuals.
- Culms creeping; plants polygamous . . . . . 1. *E. hypnoides.*
- Culms erect, ascending or decumbent; flowers perfect.
  - Spikelets 2–5-flowered, 2–3 mm. long.
    - Spikelets on long capillary pedicels; culms branched only at the base . 2. *E. capillaris.*
    - Spikelets on pedicels not over 5 mm. long; culms branched at the nodes 3. *E. Frankii.*

Spikelets 5–many-flowered, 5 mm. or more long.
  Spikelets not more than 1.5 mm. wide . . . . . 4. *E. pilosa.*
  Spikelets 2–3 mm. wide.
    Florets densely imbricated; rhachilla-joints and base of florets hidden 5. *E. megastachya.*
    Florets rather loosely imbricated; rhachilla-joints or base of florets visible . . . . . 6. *E. minor.*
Perennials.
  Panicle elongated, the branches flexuous . . . . . 7. *E. trichodes.*
  Panicle diffuse, the branches stiff and spreading.
    Pedicels as long as the spikelets or longer . . . . . 8. *E. pectinacea.*
    Pedicels shorter than the appressed spikelets . . . . . 9. *E. refracta.*

1. **E. hypnoìdes** (Lam.) BSP. *Extensively creeping;* culms slender, 2–5 dm. long, *with short erect or ascending panicle-bearing branches* 5–12 cm. high; leaves 1–4 cm. long; panicles nearly simple, of rather few lanceolate-oblong spikelets (or in the more fertile plant almost capitate); *spikelets* 10–35-*flowered*, 5-15 mm. long, the *flowers perfect and fertile, staminate or pistillate;* glumes and lemmas acuminate. (*E. reptans* Nees.) — Gravelly or sandy shores and ditches, Vt. to Ont., westw. and southw. Aug.

148. E. capillaris. Spikelet × 2.

2. **E. capillàris** (L.) Nees. Slender, erect, 1.5–6 dm. high, *branching at the base, simple above;* sheaths overlapping, sparingly pilose or nearly glabrous; blades long and narrow; *panicle more than half the entire height of the plant*, oblong-ovoid, the capillary branches spreading, the *lower ascending; spikelets* 2–3 mm. long, *on long divergent pedicels;* glumes and lemmas acute, the latter faintly 3-nerved. — Sandy dry soil, N. E. to Mo., and southw. Aug., Sept. — Often lemon-scented. Fig. 148.

3. **E. Fránkii** (Fisch, Mey. & Lall.) Steud. Erect from a decumbent base, or spreading, *diffusely branched*, 1.5–4 dm. high; sheaths glabrous; ligule pilose; blades 5–12 cm. long, 2–4 mm. wide, scabrous above; *panicles oblong, less than half the length of the plant, many-flowered, the short branches spreading; spikelets* 2–3 mm. long, *on more or less appressed pedicels,* 1–5 *mm. long;* glumes and lemmas very acute, the latter faintly 3-nerved. — Low or sandy ground, Mass. to Kan., and southwestw. Aug. — The taller sparingly branched forms, with rather loose panicles, are difficult to distinguish from glabrous specimens of the preceding; the relative length of the panicle is the best distinction.

149. E. pilosa. Spikelets × 2. Floret and lemma × 4.

4. **E. pilòsa** (L.) Beauv. Erect, decumbent at base or spreading, 1.5–4.5 dm. high; culms slender, diffusely branching near the base; sheaths sparingly pilose at the summit; blades 3–12 cm. long, 2–3 mm. wide; panicle diffuse, 0.8–2 dm. long, *lower axils usually sparingly bearded; spikelets* 5–18-*flowered, becoming linear,* 4–9 *mm. long,* 1–1.5 *mm. wide,* equaling or shorter than the pedicels; lemmas subacute, the lateral nerves faint or rather strong. — Sandy or gravelly open ground, Me. to Minn., and southwestw. July, Aug. (Mex., Eu., etc.) Fig. 149. — Variable, the commoner form in the north, with rather appressed spikelets (1.5 mm. wide) about equaling the pedicels, is considered distinct by some (*E. Purshii* Schrad.), but the characters used to distinguish it are very inconstant.

150. E. megastachya. Spikelet × 2.

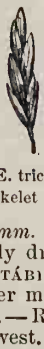
5. **E.** megastàchya (Koeler) Link. Erect or ascending from a decumbent base, rather flaccid, freely branching; culms 2–9 dm. high; leaves 5–15 cm. long, 3–6 mm. wide; panicles greenish-lead-color, 5–15 cm. long, rather densely flowered; *spikelets* 5–15 mm. long, 3 *mm. wide,* 10–40-flowered, the *florets closely imbricated;* pedicels and keels of the acute glumes and lemmas sparingly glandular; lemmas thin, scabrous, the lateral nerves prominent. (*E. major* Host.) — Waste places, common, especially southw. June–Sept. — Strong-scented, hence called Stink or Snake Grass. (Nat. from Eu.) Fig. 150.

6. **E. mìnor** Host. Similar to the preceding, smaller, more slender; panicles less densely flowered; *spikelets* 5–10 mm. long, 2–2.5 *mm. wide,* 8–20-flowered,

the florets less densely imbricated, the bases or rhachilla-joints visible; lemmas nearly smooth. (*E. Eragrostis* Karst.) — Waste ground, not common, N. E. to Va., and southw. (Nat. from Eu.) Fig. 151.

151. E. minor. Spikelet × 2.

7. **E. trichòdes** (Nutt.) Nash. Erect, 6–15 dm. high; *sheaths* overlapping, *smooth*, pilose at the throat; blades 1–7 dm. long, 2–6 mm. wide, rather rigid, involute-taper-pointed; *panicles pale, oblong*, the lower axils sparingly pilose; *spikelets* 3–10-flowered, 5–10 mm. long, *on capillary flexuous usually long pedicels;* glumes and lemmas acute, scabrous. (*E. tenuis* Gray, not Steud.) — Sandy soil, O. to Ill., Kan., and southw. Aug.–Oct. Fig. 152.



152. E. trichodes. Spikelet × 2.

8. **E. pectinàcea** (Michx.) Steud. Erect or ascending, 3–8 dm. high; culms rigid, from short stout rootstocks; *sheaths* overlapping, *sparingly pilose, densely bearded at the throat;* blades 1–3 dm. long, 4–8 mm. wide, often involute in drying; *panicles purple, included at base or exserted after the upper spikelets have fallen*, branches pilose in the axils; *spikelets* 5–10-*flowered*, 3–8 *mm. long, on stiff pedicels; glumes and lemmas acute*, minutely scabrous. — Sandy dry ground, Me. to S. Dak., and southw. July–Oct. Fig. 153. Var. SPECTÁBILIS Gray. *Sheaths glabrous* or nearly so; panicles rather more exserted than in the species; *spikelets* 8–15-*flowered.* — Range of the species, but the commoner form toward the west.

153. E. pectinacea. Spikelet × 2.

9. **E. refrácta** (Muhl.) Scribn. Erect; culms less stout than in the last, 3–9 dm. high; *sheaths overlapping, glabrous, sparingly villous at the throat;* blades 1–3 dm. long, 2–4 mm. wide, nearly smooth; *panicle usually included at the base, the slender remote branches* sparsely pilose in the axils and *bearing few short-pediceled appressed spikelets* 6–25-*flowered*, 6–12 *mm. long; glumes and lemmas acuminate.* (*E. campestris* Trin.; *E. pectinacea*, var. *refracta* Chapm.; *Poa refracta* Muhl.) — Sandy open ground, Del. and Md. to Fla. and Ala.

64. CATABRÒSA Beauv.

Spikelets usually 2-flowered; glumes unequal, shorter than the lemmas, erose at the broad summit; lemmas subcoriaceous, erose-truncate, strongly 3-nerved; palea as long as the lemma, the strong nerves near the margin. — A creeping perennial aquatic with flat leaves and open panicles of small spikelets. (Name from *κατάβρωσις*, *an eating*, referring to the eroded glumes.)

1. **C. aquática** (L.) Beauv. Smooth throughout, decumbent and rooting at the lower nodes, the ascending culms 1–6 dm. high; the loose sheaths overlapping; blades soft, 2–12 cm. long, 2–6 mm. wide; panicle 0.5–2 dm. long, the whorled branches spreading; spikelets 3–4 mm. long. — In water or wet places, coast of N. B., Nfd., and northw. (Eurasia.)

65. MÉLICA L. Melic Grass

Spikelets 2–several-flowered; rhachilla prolonged beyond the fertile florets, and bearing 2 or 3 gradually smaller empty lemmas, convolute together or inclosing one another at the apex; glumes large, unequal, membranaceous, or papery, scarious-margined, 3–5-nerved, little shorter than the florets; lemmas convex, 7–13-nerved, firm, with scarious margins, awnless or awned below the bifid apex; paleas shorter than their lemmas, the strong nerves nearly marginal — Perennials with simple culms, closed sheaths, usually soft flat leaves and rather large spikelets in usually narrow panicles. (An old Italian name for Sorghum, from *mel*, honey.)

§ 1. EUMÉLICA Scribn. *Glumes broad and papery; sterile lemmas broad and truncate, convolute around each other; lemmas awnless.*

* *Glumes subequal, nearly as long as the 2-flowered spikelets.*

1. **M. mùtica** Walt. Culms erect from knotted rootstocks, wiry, 6–9 dm. high; *sheaths* usually overlapping, *scabrous*; lower blades short, the upper 10–20 cm. long, 2–10 mm. wide; panicle 0.8–2.5 dm. long, simple, with *filiform ascending branches or reduced to a raceme;* spikelets 7–10 mm. long, pendulous on short pedicels, florets spreading, 6–8 mm. long; *lemmas* scabrous, *obtuse*, the intermediate nerves vanishing above; empty lemmas cucullate above, exceeded by the fertile ones.—Dry rocky open woods and thickets, Pa. to Fla., w. to Wis., Ia., and Tex. Apr., May. FIG. 154.—From Va. southw. occasional specimens have sparsely pubescent sheaths and the blades somewhat pubescent on the lower surface. (*M. diffusa* Pursh; *M. mutica*, var. *diffusa* Gray); not varietally distinct.

154. M. mutica. Spikelet displayed ×2.

** *Glumes unequal, shorter than the 3–5-flowered spikelets.*

2. **M. nìtens** Nutt. *Culms* 8–12 *dm. high*, erect from a short horizontal rootstock; *sheaths* overlapping, *glabrous;* blades 1–2 dm. long, 4–8 mm. wide; panicle 1.5–2.5 dm. long, the *slender spreading branches* solitary or in pairs, simple or sparingly branched; spikelets numerous, 10–12 mm. long, usually 3-flowered, pendulous on short pedicels; *lemmas* 7–9 mm. long, scabrous, *acute;* empty lemmas broad at the summit, exceeded by the fertile ones. (*M. diffusa* of recent authors, not Pursh.)—Rocky woods, Pa. to Neb., and southw. May, June.

3. **M. Portèri** Scribn. *Culms* erect, slender, 5–7.5 *dm. high; sheaths* overlapping, *scabrous;* blades 12–23 cm. long, 2–6 mm. wide, scabrous; panicle 1.5–2.5 dm. long; the *narrow spikelets* pendulous and *racemose along the slender ascending branches*, 4–6-*flowered*, 10–13 mm. long; lemmas 7–8 mm. long, subacute, scabrous; *empty lemmas like the fertile ones and exceeding them.* (*M. parviflora* Scribn.)—Bluffs and stony hillsides, Ia. to Mo., and westw.

§ 2. BROMÉLICA Thurb. *Glumes narrow, scarious-margined; sterile lemmas similar to the fertile which are awned below the bidentate apex; spikelets 5–9-flowered.*

4. **M. Smíthii** (Porter) Vasey. Culms erect, slender, 7–12 dm. high; sheaths scabrous; blades 10–20 cm. long, 6–12 mm. wide, lax, scabrous; panicle 1.2–2.5 dm. long, the solitary remote spreading branches spikelet-bearing toward the ends; *spikelets* 3–6-flowered, 18–20 *mm. long*, more or less tinged with purplish chestnut; glumes acute; *lemmas glabrous, about* 10 *mm. long, excluding the awn, which is* $\frac{1}{3}$–$\frac{1}{2}$ *as long.* (*Avena* Porter.)—Moist woodlands, n. Mich. and westw. May–July. FIG. 155.

155. M. Smithii. Spikelet displayed ×⅔.

5. **M. striàta** (Michx.) Hitchc. Similar to the preceding, usually not so tall and more slender; leaves narrower; sheaths closed to the summit, *the ligule sheathing the culm;* panicle-branches ascending or spreading at the ends; *spikelets* 2.2–2.5 *cm. long;* glumes broader, conspicuously colored as are often the *florets* which are *short-bearded at the base; awn as long as the lemma or longer.* (*Avena* Michx.)—Rocky wooded lands, e. Que. to Pa., Minn., and westw. FIG. 156.

156. M. striata ×1. Spikelet with glumes separated. Floret.

66. DIARRHÈNA Beauv.

Spikelets 3–5-flowered, the uppermost florets sterile; glumes unequal, much shorter than the florets; lemmas broad, coriaceous, rigid, smooth and shining, convex below, 3-nerved, acuminate or mucronate-pointed; palea firm, 2-keeled; stamens 2, rarely 1; grain large, usually exceeding the lemma and palea, obliquely ovoid, obtusely beaked, with a shining coriaceous pericarp. — Nearly smooth perennials, with simple culms from a creeping rootstock, flat leaves and narrow few-flowered panicles. (Name composed of δίς, *two*, and ἄῤῥην, *man*, from the two stamens.)

157. D. diandra × 1. Spikelet and fruit.

1. **D. diándra** (Michx.) Wood. Culms 6–9 dm. high; leaves nearly as long as the culm, 1–1.8 cm. wide; panicle very simple, 1–2.5 dm. long; spikelets short-pediceled, 10–16 mm. long. (*Festuca* Michx.; *Korycarpus* Ktze.; *D. americana* Beauv.) — Shaded river banks and woods, O. to S. Dak., and southw. July, Aug FIG. 157.

67. UNÌOLA L. SPIKE GRASS

Spikelets compressed, 3-many-flowered, the lower 1–4 lemmas empty; glumes compressed-keeled, acute or acuminate; lemmas firm-coriaceous, compressed-keeled, faintly many-nerved; palea rigid, the keels broadly winged, nearly marginal; stamens 1 or 3. — Erect perennials, with simple culms, flat or involute leaves and terminal panicles. (Ancient name of some plant, a diminutive of *unio*, unity.)

158. U. laxa. Spikelet × 3.

* *Panicle contracted, wand-like; spikelets few-flowered*

1. **U. láxa** (L.) BSP. Culms slender, 6–12 dm. high, in clumps with knotted rootstocks; *leaves long and narrow;* panicles 1.5–4.5 dm. long, the slender branches erect; *spikelets* short-pediceled, 3–6-*flowered*, 5–7 *mm. long; lemmas* 3–4 *mm. long, acuminate, spreading at maturity; palea arched.* (*U. gracilis* Michx.) — Sandy soil, L. I. to Fla., w. to Ky. and Tex. Aug., Sept. FIG. 158.

** *Panicle expanded, nodding; the spikelets many-flowered.*

2. **U. latifòlia** Michx. Culms 6–15 dm. high; sheaths shorter than the internodes, *ligule* 1 *mm. long, lacerate; blades spreading*, 10–22 *cm. long*, 0.5–2 *cm. wide*, often ciliate at the base, margins scabrous; panicle 1–2.5 dm. long, *the filiform branches bearing a few pendulous broadly oval spikelets; these* 1.5–3 *cm. long*, 6–12-flowered; *lemmas* 9–12 *mm. long, hispidulous on the winged keel; stamen* 1. — Shaded slopes and low thickets, Pa. to Kan., and southw. Aug., Sept. FIG. 159.

159. U. latifolia. Spikelet × 1. Floret and lemma × 2.

3. **U. paniculàta** L. (SEA OATS.) Culms stout, 9–15 dm. high, with *numerous long rigid leaves involute in drying; ligule a ring of hairs about* 1 *mm. long;* panicles 2–3 dm. long, the *slender branches bearing many short-pediceled oblong-oval stramineous spikelets; these* 1–2 *cm. long*, 8–16-*flowered; lemmas* 8–10 *mm. long, scabrous on the keel; stamens* 3. — Sand hills and drifting sands coast, Va. to Tex. Sept., Oct. (Mex., S. A.)

160. D. spicata × 1. ♀ Spikelet and floret. ♂ Floret.

68. DISTÍCHLIS Raf. SPIKE GRASS. ALKALI GRASS

Spikelets dioecious, 8–16-flowered, compressed; glumes unequal, firm, keeled, acute; lemmas coriaceous, rigid, faintly many-nerved. — Rigid erect perennials with extensively creeping rootstocks, involute leaves and small crowded panicles of large smooth spikelets. (Name from δίστιχος, *two-ranked.*)

1. **D. spicàta** (L.) Greene. Pale or glaucous; culms

1.5–6 dm. high; sheaths overlapping; blades often conspicuously distichous, rigidly ascending; the narrow panicle 2–6 cm. long (rarely longer); spikelets 8–18 mm. long, the florets closely imbricated. (*D. maritima* Raf.) — Salt marshes along the coast, N. S. to Tex.; also in alkaline soil in the interior. (Mex.) Fig. 160.

69. BRÌZA L. Quaking Grass

Spikelets few-several-flowered, broad, often heart-shaped; florets crowded, almost horizontal, the uppermost usually imperfect; glumes subequal, firm-membranaceous, with broad scarious margins; lemmas 5–many-nerved (nerves often obscure), firm, subchartaceous with a scarious margin, boat-shaped or ventricose, heart-shaped at base; palea much smaller than its lemma. — Annuals or perennials with flat leaves and showy terminal panicles. (Βρίζα, the Greek name of a kind of grain.)

161. B. media × 1½. Spikelet and floret.

1. B. mèdia L. *Perennial*, erect, 4–7 dm. high; *sheaths longer than the narrow blades;* panicle erect, the stiff capillary branches spreading; *spikelets* nodding, 5–9-flowered, 6 *mm. long*, nearly as broad, brown and shining; *lemmas boat-shaped.* — Fields and waste places, Ont. and N. E. June. (Adv. from Eu.) Fig. 161.

2. B. mìnor L. *Annual;* culms 1–4 dm. high, often branching at the base; leaves 4–12 cm. long, 4–8 mm. wide; panicle erect, its slender branches finally spreading, bearing fascicled branchlets; *spikelets* hardly nodding, 3–6-flowered, pale or plum-color, broadly heart-shaped, 3 *mm. long*, slightly broader; *lemmas strongly ventricose below.* — Waste places, N. J., Va., and southw. June. (Adv. from Eu.)

70. DÁCTYLIS L. Orchard Grass

Spikelets 2–5-flowered, compressed, nearly sessile in dense fascicles, these arranged in a panicle; glumes unequal, hispid-ciliate on the keel, acute or mucronate; lemmas 5-nerved, ciliate-keeled, short awn-pointed; paleas a little shorter than their lemmas. — Perennial with flat leaves and glomerate panicles. (*Dactylos*, a name used by Pliny for a grass with digitate spikes, from δάκτυλος, *a finger.*)

1. D. glomeràta L. Coarse, tufted, glaucous, scabrous; culms erect, 9–12 dm. high; leaves broadly linear; panicle 8–15 cm. long, the few stiff branches naked below, contracted after flowering; spikelets crowded in dense one-sided clusters at the ends of the branches. — Fields and waste places June. (Nat. from Eu.) Fig. 162.

162. D. glomerata × 2. Spikelet displayed.

Cynosùrus cristàtus L. (Dog's-tail Grass), a slender erect perennial 4–7 dm. high, with narrow leaves and erect dense spike-like panicles, the spikelets unisexual, arranged in clusters, the terminal ones fertile, the lower larger and sterile, with very narrow lemmas, strongly scabrous on the keel, occurs sparingly in fields and by waysides, Nfd. to Ont. (Adv. from Eu.)

71. PÒA L. Meadow Grass. Spear Grass

Spikelets 2–6-flowered, the uppermost floret imperfect or rudimentary; glumes 1–3-nerved, keeled; lemmas herbaceous or membranaceous, mostly scarious-tipped, acute or obtuse, keeled, awnless, 5-nerved (the intermediate pair of nerves sometimes very obscure), the dorsal or marginal nerves usually soft-hairy, often with a tuft of long cobwebby hairs at the base; palea 2-toothed. — Annuals or perennials, with simple culms, narrow usually flat leaves ending in a cucullate point, and terminal panicles. (Πόα, an ancient Greek name for grass or fodder.)

Annuals.
- Florets not webby at the base; lemmas distinctly 5-nerved . . . 1. *P. annua.*
- Florets webby at the base; intermediate pair of nerves obscure . . 2. *P. Chapmaniana.*

Perennials.
- Culms from extensively creeping rootstocks, not tufted.
  - Culms flattened; spikelets not over 6 mm. long . . . . . 3. *P. compressa.*
  - Culms terete; spikelets 8 mm. or more long . . . . . 4. *P. eminens.*
- Culms tufted.
  - Creeping rootstocks present.
    - Panicle crowded; culms much exceeding the leaves . . . . 10. *P. pratensis.*
    - Panicle diffuse; culms scarcely exceeding the basal leaves . . 17. *P. brachyphylla.*
  - No creeping rootstocks, but culms sometimes decumbent at base.
    - Lemma glabrous . . . . . 13. *P. debilis.*
    - Lemma pubescent at least on the keel.
      - Culms upright from a stout crown or caudex; leaves short and flat 5. *P. alpina.*
      - Culms from a more slender base forming loose tufts, often decumbent.
        - Culms rarely over 3 dm. high, with lax leaves, the decumbent bases of the culms forming loose tufts; lemma pubescent but very sparsely webbed; alpine or northern plants . . 6. *P. laxa.*
        - Culms taller, or if low, stiff and with scarcely decumbent bases.
          - Lemma not webbed at base.
            - Panicle narrow; lemma glabrous between the nerves below 7. *P. glauca.*
            - Panicle spreading; lemma pubescent between the nerves below . . . . . 16. *P. autumnalis.*
          - Lemma webbed at base.
            - Marginal nerves glabrous.
              - Lemma prominently nerved; sheaths scabrous . . . 11. *P. trivialis.*
              - Lemma obscurely nerved; sheaths smooth . . . 14. *P. alsodes.*
            - Marginal nerves pubescent.
              - Intermediate nerves of lemma obscure; florets acute.
                - Panicle erect, 0.4–1 dm. long (rarely longer), branches ascending . . . . . 8. *P. nemoralis.*
                - Panicle drooping, 1–3 dm. long, branches spreading . 9. *P. triflora.*
              - Intermediate nerves of lemma prominent; florets obtuse or acutish.
                - Branches of panicle spikelet-bearing from the middle; spikelets 3–4 mm. long . . . . . 12. *P. sylvestris.*
                - Branches of panicle elongated, spikelet-bearing only at the ends; spikelets 5–6 mm. long . . . . 15. *P. Wolfii.*

* *Annuals, rarely over 2.5 dm. high, tufted.*

1. P. Annua L. (Low Spear Grass.) Culms flattened, decumbent at base, sometimes rooting at the lower nodes; *sheaths loose;* leaves very soft; panicle pyramidal, 3–8 cm. long, rarely longer; spikelets crowded, 3–6-flowered, about 4 mm. long; *lemma distinctly 5-nerved, the nerves hairy below.* — Cultivated and waste grounds, everywhere. Apr.–Oct. (Nat. from Eu.)

2. P. Chapmaniana Scribn. Similar to the preceding but more strict in habit; culms terete, erect; *sheaths close, mostly at the base;* panicle more oblong; *florets webbed at the base, the intermediate nerves of lemmas very obscure,* the middle and marginal nerves sometimes hairy below. — Dry soil, Va. to s. Ill., and southw. Apr., May.

** *Perennials.*

← *Culms from extensively creeping rootstocks, not tufted.*

3. P. compressa L. (Canada Blue Grass. Wire Grass.) *Bluish-green,* 2–6 dm. high; culms geniculate-ascending, *wiry, flattened; panicles* 2–8 *cm. long,* narrow, the usually short branches in pairs, spikelet-bearing to the base; *spikelets* crowded, subsessile, 3–6 (rarely 9)-flowered, 4–6 *mm. long; lemmas obscurely nerved, more or less bronzed at the summit.* — Dry mostly sterile soil, Nfd. to S. C., and westw.; also cultivated as a pasture grass. May–Sept. (Nat. from Eu.) Fig. 163.

163. P. compressa. Panicle × 1/4. Spikelet and floret × 2. Lemma × 3.

4. P. éminens J. S. Presl. *Glaucous,* glabrous, 3–9 dm. high; *culms stout,* erect, *terete;* sheaths overlapping, clustered on the sterile shoots; *blades thick,* 3–8 mm. wide; *panicle heavy,* 8–16 *cm. long,* contracted; *spikelets* 3–5-flowered, 8–12 *mm. long; lemmas* 4–5 *mm. long, distinctly*

nerved. (*P. glumaris* Trin.) — Gravelly seashores, Lower St. Lawrence R., and northw.; also Alaska. (E. Asia.)

+ + Culms tufted.

++ Alpine or high northern plants; culms 4 dm. high or less.

5. **P. alpìna** L. *Culms erect from a stout crown or caudex*, rather stout, 0.5–4 dm. high; upper *blades* much shorter than their sheaths, 3–6 *mm. wide; panicle pyramidal*, 3–7 cm. long, the *filiform branches spreading*, mostly naked at the base; *spikelets rather crowded, broadly ovate*, 3–6-flowered, 5–6 mm. long; lemmas 4 mm. long, villous on the midrib and margins. — Brooksides, open mountain slopes, etc., N. S., Isle Royale, northern shore of L. Superior, and northw. June–Aug. (Eurasia.)

6. **P. láxa** Haenke. Moss-green, *forming loose tufts;* culms slender, 2–4 dm. high; *blades about 2 mm. wide; panicle* 2.5–7 cm. long, *simple, often one-sided and nodding, loosely flowered*, the *filiform branches erect or ascending*, spikelet-bearing at the ends; spikelets 2–4-flowered, about 5 mm. long; lemma 3–3.5 mm. long, pilose on the midrib and margins toward the base. — Alpine regions, N. E., n. N. Y., and high northw. (Eu.)

++ ++ Not strictly alpine; culms taller or if low not decumbent at base.

= Panicle narrow; lemma not webbed at the base.

7. **P. glaúca** Vahl. Glaucous; culms strict, rather rigid, 1.5–6 dm. high, sheaths crowded at the base; blades 3–5 cm. long, about 2 mm. wide; ligule not over 1 mm. long; panicle 3–7 cm. long, rather compact, *the short scabrous branches erect; spikelets* often purplish, 2–5-flowered, 5–6 *mm. long;* glumes acute or acuminate; lemmas 3–3.5 mm. long, villous on the keel and marginal nerves below; intermediate nerves obscure. (*P. caesia* Sm.) — Rocky shores and mts., e. Que. and n. N. E. to n. Minn., northw. and westw. (Eurasia.)

= = Panicle open, branches naked toward the base; lemma webbed at the base except in no. 16.

a. *Spikelets numerous, more or less crowded.*

b. *Marginal and midnerve silky-pubescent.*

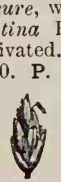
8. **P. nemoràlis** L. Grass-green, 3–7 *dm. high*, rarely higher; culms slender, less rigid than in the preceding, leafy throughout; *leaves* lax, 3–8 *cm. long*, 2 *mm. wide; panicle* 4–10 *cm. long*, open and spreading; spikelets 2–5-flowered, 3–5 mm. long; glumes sharply acuminate; lemmas 2–3 mm. long, *intermediate nerves obscure*, a few webby hairs at base. — Meadows and open woods, Nfd. to Pa., w. to Minn., northw. and westw. June–Sept. (Eurasia.) FIG. 164. — Alpine forms may be low and erect, 1–2 dm. high, with small narrow panicle, while luxuriant forms of lower altitude may be creeping at base.

164. P. nemoralis. Spikelet × 3.

9. **P. triflòra** Gilib. (FOWL MEADOW GRASS.) *Culms* 3–15 *dm. high;* sheaths rather loose; *ligule* 3–5 *mm. long; blades* 8–15 *cm. long*, 2–4 *mm. wide*, soft; *panicle* often purplish, 1–3 *dm. long, pyramidal or oblong*, the *filiform spreading branches in remote fascicles of* 3–10, naked at the base; *spikelets* 2–4-flowered, about 4 mm. long, *hardly crowded;* lemmas 2.5–3 mm. long, *intermediate nerves obscure*, webby hairs copious. (*P. flava* Am. auth., not L.; *P. serotina* Ehrh.) — Wet meadows, Pa. to Ia., and northw; also cultivated. July, Aug. (Eurasia, n. Afr.) FIG. 165.

165. P. triflora. Spikelet × 3.

10. **P. pratènsis** L. (JUNE GRASS, SPEAR GRASS, KENTUCKY BLUE GRASS.) Culms 3–12 dm. high, *sending out numerous running rootstocks from the base;* sheaths compressed, overlapping below, *ligule* 1.5 *mm. long;* blades 1–6 mm. wide, those of the culm 5–15 cm. long, *the basal ones much longer;* panicle pyramidal, the slender branches in rather remote fascicles of 3–5, ascending, naked at base; *spikelets crowded*, 3–5-flowered, 4–5 mm. long; lemmas 3 mm. long, copiously webbed at base;



166. P. pratensis. Spikelet × 3.

intermediate nerves strong, glabrous. — Fields and meadows throughout the U. S. and B. C., naturalized in the East, indigenous in the North and West. May-July. (Eurasia.) FIG. 166.

b b. Marginal nerves glabrous.

11. **P. triviàlis** L. (ROUGH-STALKED MEADOW GRASS.) Culms erect from a somewhat decumbent base, 3–9 dm. high, *scabrous below the panicle; sheaths and blades retrorsely scabrous, ligule 4–6 mm. long;* panicle 6–15 cm. long, resembling that of *P. pratensis;* spikelets 2–3-flowered, about 3 mm. long; lemma strongly nerved, *silky-pubescent on the keel only.* — Moist meadows and roadsides, e. Que. to S. C. and La., rarely inland. May–Aug. (Nat. from Eu.)

a a. Spikelets fewer, scattered on slender pedicels; plants soft and smooth, flowering early.

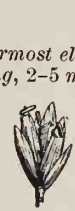
b. Spikelets 2–4 mm. long; lemmas broad, obtuse.

12. **P. sylvéstris** Gray. *Culms subcompressed*, 3–12 dm. high; sheaths shorter than the internodes; *ligule 1 mm. long or less; blades 2–6 mm. wide*, those of the culm 3–15 cm. long, *the basal ones much longer;* panicle 1–2 dm. long, oblong-pyramidal, the *short flexuous filiform branches spreading or reflexed;* spikelets 2–4-flowered, 2.5–4 mm. long; first glume 1-, the second 3-nerved; lemmas about 2.5 mm. long, often pubescent below, midnerve pubescent to the summit. — Rich woods and thickets, N. Y. to Wis., Neb., and southw. Apr.–July.

13. **P. débilis** Torr. *Culms terete, weak*, 3–10 dm. high; *sheaths compressed*, much shorter than the internodes; *ligule 1–2 mm. long; blades 2.5–11 cm. long, 2 mm. wide or less* (rarely wider); *panicle nodding*, 4–12 cm. long, *the few long capillary branches ascending or spreading at the ends*, few-flowered; spikelets 2–4-flowered, 3–4 mm. long; *lemmas glabrous, except the webbed base.* — Rocky woodlands, e. Que. to Ont., southw. to Pa. and Ia. May, June.

b b. Spikelets 5–6 mm. long; lemmas lanceolate, acute.

14. **P. alsòdes** Gray. Culms 2–6 dm. high; *sheaths thin, the uppermost elongated, often sheathing the base of the panicle; blades 1.2–3 dm. long, 2–5 mm. wide;* panicle 1–2 dm. long, the filiform branches in 3's or 4's, finally spreading, or the lowest whorl ascending; spikelets 2–3-flowered, about 5 mm. long; *lemmas faintly nerved, villous on the keel below.* — Wooded hillsides and thickets, e. Que. to Minn., and southw. May, June. FIG. 167.



167. P. alsodes. Spikelet × 3.

15. **P. Wólfii** Scribn. Culms slender, 4–9 dm. high; *leaves mostly clustered at the base, 2 mm. wide or less, those of the culms 5–10 cm. long, the basal ones much longer;* panicle 8–15 cm. long; the spikelets somewhat clustered toward the ends of the ascending capillary branches, 2–4-flowered, 5–6 mm. long; *lemmas strongly nerved, the marginal nerves and midnerve villous.* — Minn. and Ill. to Tenn., rare.

b b b. Spikelets 6–8 mm. long; lemmas oblong, conspicuously scarious at the obtuse apex; panicle diffuse, few-flowered.

16. **P. autumnàlis** Muhl. Culms slender, 3–9 dm. high; leaves 5–12 cm. long, 2–3 mm. wide; panicle 8–20 cm. long, about as broad, the capillary flexuous spreading branches with a few spikelets near the ends; spikelets 4–6-flowered, about 6 mm. long; *lemmas pubescent below between the strong nerves, not webbed at base.* (*P. flexuosa* Muhl.) — Woods, N. J. and Pa. to Mo., and southw. Mar.–May.

17. **P. brachyphýlla** Schultes. Culms 3–5 dm. high from *running rootstocks*, 2–3-leaved; *the upper leaves 1–5 cm. long, the basal ones about equaling the culm, abruptly cuspidate-tipped;* panicle 7–12 cm. long, the branches mostly in pairs, spreading, spikelet-bearing at the ends; spikelets 3–4-flowered; *lemma webbed at base, keel and marginal nerves sparingly pubescent*, intermediate nerves prominent, naked. (*P. brevifolia* Muhl.) — Rocky or hilly woodlands, Pa., Va., and sparingly westw. to Ky. and Ill. Apr., May.

72. SCOLÓCHLOA Link.

168. S. festucacea. Panicle × 1/10. Spikelet and floret × 1.

Spikelets 3–4-flowered; callus hairy; glumes acute; lemmas firm, convex below, the nerves unequal, one or more excurrent as slender teeth; palea as long as its lemma or longer, 2-toothed; ovary hairy at the summit. — Tall perennials with flat leaves and ample spreading panicles. (Name probably from σκῶλος, *a prickle*, and χλόα, *grass*.)

1. S. festucàcea (Willd.) Link. (Sprangle-top.) Culms stout, erect, from thick soft rootstocks, 1–2 m. high; leaves 2–3 dm. long; panicles 1.5–3.5 dm. long, the fascicled branches spreading; spikelets 6–12 mm. long; glumes nearly as long as the florets, 3–5-nerved. — Marshes and shallow water, Ia., Minn., and northwestw. June, July. Fig. 168.

73. GLYCÈRIA R. Br. Manna Grass

Spikelets few–many-flowered, subterete or slightly compressed, in narrow or spreading panicles; glumes unequal, shorter than the florets; lemmas convex, firm, with a scarious margin or apex, and 5–9 strong parallel nerves; paleas equaling or a little longer than their lemmas, the strong nerves nearly marginal. — Usually tall aquatic perennials, with simple culms, often partially closed sheaths, flat leaves and terminal panicles. (Name from γλυκερός, *sweet*, in allusion to the taste of the grain.) Panicularia Fabricius.

Spikelets 2–7 mm. long, ovate or oblong.
- Panicle contracted, narrow.
  - Panicle linear, 1.5–3 dm. long . . . . . 1. *G. Torreyana.*
  - Panicle oblong, dense, 7–12 cm. long . . . . . 2. *G. obtusa.*
- Panicle open, lax.
  - Spikelets 3–4 mm. wide; lemmas obscurely nerved.
    - Spikelets ovate, 5–10-flowered . . . . . 3. *G. canadensis.*
    - Spikelets oblong, 3–5-flowered . . . . . 4. *G. laxa.*
  - Spikelets not over 2.5 mm. wide; lemmas strongly nerved.
    - Second glume 1 mm. long . . . . . 5. *G. nervata.*
    - Second glume 2–2.5 mm. long.
      - Panicles ample, many-flowered, 2 dm. or more long . . . . 6. *G. grandis.*
      - Panicles narrow, few-flowered, rarely 1.5 dm. long . . . . 7. *G. pallida.*

Spikelets 1–4 cm. long, compressed-cylindric.
- Lemma obtuse; palea about the same length.
  - Lemma 6 mm. long . . . . . 8. *G. fluitans.*
  - Lemma 3–4.5 mm. long.
    - Spikelets 1.5–2 cm. long, subsessile or nearly so . . . . . 9. *G. septentrionalis*
    - Spikelets 1–1.5 cm. long, on slender pedicels one third to two thirds as long . . . . . 10. *G. borealis.*
- Lemma acute, much exceeded by the palea . . . . . 11. *G. acutiflora.*

1. G. Torreyàna (Spreng.) Hitchc. Culms solitary or few, erect from a running rootstock, 6–9 dm. high; *the smooth sheaths closed nearly to the summit; blades* 3 dm. or more long, 3–6 *mm. wide*, scabrous; *panicle linear*, 1.5–3 *dm. long*, nodding at the summit; *spikelets* appressed, 3–4-flowered, *about* 4 *mm. long.* (*G. elongata* Trin.) — Wet woods, Que. to Minn. and Pa., and in the mts. to N. C. July, Aug.

2. G. obtùsa (Muhl.) Trin. Culms stout, erect, 3–12 dm. high; *sheaths closed about half their length*, the lower overlapping; *blades* 2–5 *dm. long*, 4–8 *mm. wide*, smooth below, rough above; *panicle finally exserted, oblong, dense*, 6–18 *cm. long; spikelets* 3–7-flowered, 5–6 *mm. long;* the scarious apex of the lemma often revolute. — Bogs and swampy places, N. B. to Pa., and southw. near the coast. July, Aug.

169. G. canadensis. Spikelet × 3.

3. G. canadénsis (Michx.) Trin. Rattlesnake Grass. Culms solitary or few, stout, erect, 6–10 dm. high; sheaths overlapping below, compressed; blades 1.5–3.5 dm. long, 4–8 mm. wide, scabrous; *panicle* 1.5–3 dm. long, nearly as wide, *very loose and open, the capillary remote branches drooping, naked*

below; spikelets 5–10-flowered. *ovate, tumid, Briza-like,* 5–7 mm. long; lemmas obtuse or abruptly acute. — Bogs and wet places, Nfd. to Ont. and Minn., s. to N. J. and e. Kan. July. Fig. 169.

4. G. láxa Scribn. Similar to tall forms of the preceding, 1–1.5 m. high; blades sometimes 6 dm. or more long; panicle diffuse, 3–4 dm. long, nearly as wide; *spikelets* 3–5-*flowered,* 4–5 *mm. long,* 3 *mm. wide, oblong; florets firm but not tumid;* lemmas abruptly acuminate; palea nearly as long. — Swampy places, Me. to N. J. July–Sept.

170. G. nervata. Spikelet and floret × 4. Base of lemma × 6.

5. G. nervàta (Willd.) Trin. Fowl Meadow Grass. Often in large clumps; culms erect, 3–10 dm. high; sheaths scabrous, closed almost to the summit, the lower overlapping; blades 1.5–3 dm. long, 4–10 mm. wide, scabrous above; *panicle* expanded, nodding, 1–2 *dm. long,* the capillary branches drooping, naked below; *spikelets* purplish, 3–7-flowered, 3–4 *mm. long; glumes minute, the second about* 1 *mm. long, twice as long as the first.* — Moist meadows and wet places, common, Nfd. to Fla., and westw. June. (Eu.) Fig. 170. — A low strict form (var. strícta Scribn.) occurs from Nfd. to s. Me., and also in western mts.

6. G. grándis Wats. (Reed Meadow Grass.) Culms clustered, stout, erect, 1–1.5 m. high; sheaths loose, the lower rough, overlapping; blades 1.8–3 dm. long, 6–15 mm. wide, smooth or slightly scabrous; *panicle* 2–4 *dm. long,* very compound, loose and open, nodding at the summit; *spikelets numerous, with purple florets and whitish glumes,* 4–7-flowered, 5–6 *mm. long;* the palea nearly as long as the 7-nerved lemma. (*Panicularia americana* MacM.) — Banks of streams, wet meadows, ditches, etc., e. Que. to Alaska, s. to Pa., and westw. July.

7. G. pállida (Torr.) Trin. *Culms slender,* 3–10 *dm. high, ascending from a creeping base;* leaves 5–15 cm. long, 2–8 mm. wide; panicles lax, few-flowered, 7–15 cm. long, the few slender branches ascending or spreading at the ends, naked at the base; *spikelets pale green,* loosely 4–9-flowered, 6–7 *mm. long;* glumes obtuse; lemmas 7-nerved, scabrous, dentate or erose at the obtuse apex. — Shallow water, N. S. to Va., w. to Ont., Ind., and Ky. May, June.

Var. Fernáldii Hitchc. *Culms very slender,* usually geniculate and spreading, 2–4 dm. high; leaves 4–8 cm. long, 2–3 mm. wide; panicles 5–7 cm. long, the fascicled branches lax, flexuous; *spikelets* 3–5-*flowered,* 4–5 *mm. long;* glumes and lemmas obtuse, usually erose at the summit. — Wet places, e. Que. to Me. and Minn. July, Aug.

8. G. flùitans (L.) R. Br. *Culms somewhat flattened,* erect from a creeping base, 6–10 *dm. high;* sheaths overlapping, closed nearly to the summit, smooth; *blades* 6–12 *cm. long,* 4–8 mm. wide; panicle finally exserted, 2.5–4 dm. long, very slender, the few remote branches appressed or finally horizontal, a spikelet subsessile in each axil; spikelets 7–12-flowered, 2–2.5 cm. long, nearly sessile; *glumes acute,* scarious and shining; lemmas 7-nerved, scabrous, with a shining scarious margin and summit, narrowed above but obtuse, erose; the tip of the palea exceeding the lemma. (*Panicularia brachyphylla* Nash.) — Shallow water, Gulf of St. Lawrence; near N. Y. City. June–Aug. (Eurasia.)

171. G. septentrionalis. Spikelet × 1½.

9. G. septentrionàlis Hitchc. *Culms* erect, 1–1.5 *m. high, thick and soft;* sheaths overlapping, loose, smooth, the upper closed nearly to the summit, ligule 5–6 mm. long, decurrent; *blades* 1.2–2.5 *dm. long,* 6–8 mm. wide, nearly smooth, rather obtuse; panicle 2–2.5 dm. long, the subflexuous branches ascending, a spikelet subsessile in each axil; spikelets 8–12-flowered, 1.5–2 cm. long, subsessile or on short pedicels; *glumes obtuse,* scarious and shining; lemmas 4–4.5 mm. long, *faintly* 7-*nerved, hispidulous, with a shining* scarious summit, erose-obtuse, slightly exceeded by the tip of the palea. (*G. fluitans* Am. auth., not R. Br.) — In shallow water, N. E. to Va., and westw. — Intermediate between *G. fluitans* and the following, but usually stouter and broader leaved than either. Fig. 171.

10. **G. boreàlis** (Nash) Batchelder. Similar to *G. fluitans;* the leaves commonly conduplicate; panicles 1.5–5 dm. long, often nearly simple, the slender branches erect or spreading toward the ends, a pediceled spikelet in each axil; *spikelets usually more numerous*, 7–13-flowered, 1–1.5 *cm. long, on slender pedicels* $\frac{1}{3}$–$\frac{2}{3}$ *as long;* glumes subacute; *lemmas* 3.5–4 *mm. long*, thinner, strongly 7-nerved, *minutely scabrous or glabrous, only the nerves hispidulous*, obtuse and erose at the shining scarious summit, *slightly exceeding their paleas.*—In wet places or shallow water, Nfd. to Ia., and northwestw. June–Aug.

11. **G. acutiflòra** Torr. Culms flattened, weak and slender, 3–9 dm. high; sheaths overlapping, the uppermost inclosing the base of the panicle; blades 0.8–1.5 dm. long, scabrous above; panicle simple, 1.5–3.5 dm. long, the stiff branches appressed or finally spreading; *spikelets* subsessile, 5–12-flowered, 2–4 *cm. long; lemmas* 6–8 *mm. long, acute, scabrous, exceeded by the long-acuminate bicuspidate paleas.* — Wet soil and in shallow water, Me. to Del., w. to O. May, June.

74. PUCCINÉLLIA Parl.

Spikelets as in *Glyceria* but lemmas firmer, the nerves obscure, often subacute and minutely pubescent at base.—Tufted perennials, mostly glaucous saline species. (Named for *Prof. Benedetto Puccinelli*, an Italian botanist.).

172. P. maritima. Panicle × $^1/_{10}$. Spikelet × 2. Floret × $2^1/_2$.

1. **P. marítima** (Huds.) Parl. (Goose Grass, Sea Spear Grass.) *Culms* erect, 3–5 dm. high, *from slender rootstocks;* leaves flat or involute, acute or pungent; *panicles* 8–12 *cm. long;* lower branches solitary or in pairs, appressed or expanded; *spikelets* 4–10-*flowered*, 6–12 *mm. long*; lemmas obtuse or truncate, 3–4 mm. long.—Salt marshes and beaches along the coast, Mass., and northw. July, Aug.—Somewhat variable in the form of the panicle and size of the florets. (Eu.) Fig. 172.

2. **P. angustàta** (R. Br.) Rand & Redfield. *Culms* erect or ascending, 1.5–4 dm. high, *from very slender rootstocks;* leaves very narrow and involute; *ligule long; panicles* 3–8 *cm. long*, narrow, the solitary branches appressed or finally ascending; *spikelets* 2–4-*flowered*, 3–6 *mm. long;* lemmas obtuse or subacute, 3 mm. or less long. (*P. maritima*, var. (?) *minor* Wats.)—Salt marshes and sandy coasts, Ct., and northw. June, July.

3. **P. dístans** (L.) Parl. *No rootstocks;* culms rather stout, 3–6 dm. high, geniculate below; *leaves mostly flat, short; ligule short; panicles* 5–18 *cm. long*, the *branches in* 4's *or* 5's, *soon spreading and finally deflexed*, usually naked below; *spikelets* 3–6-*flowered*, 3–6 *mm. long, crowded; first glume less than half as long as lowest floret;* lemmas truncate-obtuse, about 2 mm. long.—Salt marshes along the coast and on ballast, Del. to N. B. June–Aug.—Apparently much rarer than the last, and perhaps not native. (Eurasia, n. Afr.) Fig. 173.

173. P. distans. Spikelet × 3.

4. **P. airoìdes** (Nutt.) Wats. & Coult. Similar in habit to the preceding; *blades* 5–10 *cm. long*, often involute; panicle-branches ascending or erect or the lowest finally spreading or reflexed; *spikelets* 2–7-flowered, *not crowded; glumes acute or subacute, the first more than half as long as the lowest floret.*—In saline soil from the Dakotas southw. and westw.; occasionally eastw. in Minn. and Mich.; adv. in s. Me. (*Parlin*).

5. **P. Borrèri** (Bab.) Hitchc. Panicle compact, *the branches mostly spikelet-bearing from base and not deflexed.*—On ballast and waste places along the coast, from Del. to N. S. (Adv. from Eu.)

75. FESTÙCA L. Fescue Grass

Spikelets 2–many-flowered; glumes unequal, narrow, acute, the first 1-, the second 3-nerved; lemma firm in texture, at least below, usually narrow, convex or subcarinate, 5-nerved, acute (obtuse in 2 species) or tapering into a straight

awn; palea usually about equaling the lemma. — Perennials or annuals with terminal panicles. (An ancient Latin name of some kind of grass, of uncertain meaning.)

§ 1. Annuals; stamen usually one. — VÚLPIA (C. C. Gmel.) Reichenb.
Awn more than twice as long as the lemma; spikelets 1–5-flowered.
First glume one third to one half as long as the second . . . . . 1. *F. myuros.*
First glume two thirds to three fourths as long as the second . . . . 2. *F. sciurea.*
Awn not longer than the lemma, spikelets 5–13-flowered . . . . 3. *F. octoflora.*
§ 2. Perennials; stamens 3. — EUFESTÚCA Griseb.
Leaves involute; lemma awl-shaped, awned or pointed.
Innovations extravaginal; spikelets more or less glaucous . . . . 4. *F. rubra.*
Innovations intravaginal; spikelets green.
Awns longer than the membranaceous lemmas . . . . . 5. *F. occidentalis.*
Awns shorter than the coriaceous lemmas . . . . . 6. *F. ovina.*
Leaves flat.
Lemma indurated, not at all keeled, awnless or tapering into a short awn.
Lemma 5–7 mm. long; panicle narrow, with short erect branches . 7. *F. elatior.*
Lemma 4–4.5 mm. long; panicle with long spreading or ascending branches.
Lemma subacute; spikelets loosely scattered . . . . . 8. *F. nutans.*
Lemma obtuse; spikelets somewhat aggregated . . . . . 9. *F. Shortii.*
Lemma membranaceous, indurated only near the base, keeled above, awned from a cleft apex . . . . . 10. *F. gigantea.*

1. **F. MYÙROS** L. Culms erect or geniculate at base, solitary or in small tufts, 2–6 dm. high; *sheaths* smooth, *overlapping;* blades smooth, linear, involute or rarely flat; panicle 7–20 cm. long, narrow, the branches appressed, the tips somewhat nodding; *spikelets* 4–5-flowered, 8–11 *mm. long; glumes very unequal, the first* 1–1.5 *mm., the second* 4–5 *mm. long; lemma* linear-lanceolate, *scabrous above,* attenuate into a scabrous awn about twice its length. — Dry fields and waste places, N. E. to O., and southw. June, July. (Nat. from Eu.)

2. **F. sciùrea** Nutt. Similar to the preceding, usually lower; panicle erect; *spikelets* 4–5 *mm. long; first glume* 2 *mm., second* 3.5 *mm. long; lemma sparsely short pubescent.* — Sandy ground, s.e. Va., and southw. May, June.

3. **F. octoflòra** Walt. Culms slender, erect, often tufted, 0.5–4 dm. high; *sheaths shorter than the internodes;* blades narrowly linear, involute or rarely flat, soft, erect or ascending; *panicle* narrow, erect, 3–12 cm. long, *usually reduced to a more or less secund raceme;* spikelets 5–12 mm. long; glumes subulate-lanceolate; lemma lanceolate, attenuate into a scabrous straight awn 1–7 mm. long. (*F. tenella* Willd.) — Dry sterile soil, w. Que. to B. C., and throughout the U. S., especially southw. FIG. 174.

4. **F. rùbra** L. *Culms solitary or few, erect from creeping rootstocks,* 4–9 dm. high; sheaths and blades smooth; *panicle* 5–20 cm. long, *usually contracted,* the branches erect; spikelets 4–6 (rarely 10)-flowered, mostly 7–8 mm. long, often glaucous-purplish; glumes smooth; lemma 5–7 mm. long, smooth or scabrous toward the apex, terminating in a scabrous *awn usually about half as long.* — Brackish meadows or low sandy soil, mostly near the coast, Lab. to Va. (Eu.) Var. PROLÍFERA Piper. Floral organs abnormally elongated. — Mts. of N. E. and Que. Var. MEGÁSTACHYS Gaudin. Spikelets 10–12 mm. long. — Que., N. J. (Eu.) Var. MULTIFLÒRA (Hoffm.) Asch. & Graebn. Blades flat; spikelets green. — Me. (Eu.) Var. SUBVILLÒSA Mert. & Koch. Spikelets pubescent with short hairs. — Local, e. Que. to N. H. (*Briggs*) and Vt. (*Jones*). (Eu.)

174. F. octoflora
Spikelet × 3.

5. **F. occidentàlis** Hook. *Culms densely tufted, no rootstocks,* erect, slender, glabrous and shining, 5–8 dm. high; *basal leaves numerous, filiform-involute, soft; panicle loose,* subsecund, flexuous, 8–20 cm. long; *spikelets* loosely 3–5-flowered, 6–10 *mm. long;* glumes unequal, variable even on the same plant, mostly acute or acuminate; *lemma* 5–6.5 *mm. long, awn about as long.* — Open woods, Keweenaw Co., Mich. (*Farwell*); and in the Northwest.

6. **F. ovìna** L. (SHEEP'S FESCUE.) Densely tufted; culms erect, 1.5–6 dm. high; *leaves* pale green, capillary, strongly involute, *firm,* the basal ones 5–12 cm. long, those of the culm often very short; *panicle contracted after blooming*

175. F. ovina. Spikelet × 5.

5–10 cm. long, branches ascending; *spikelets* 5–7.5 *mm. long*, 3–6(rarely 9)-flowered, usually pale; florets rather close; *lemma* smooth or slightly scabrous, 3–3.5 *mm. long, attenuate into an awn* 1 *mm. long or more.* — Occurs native in nearly typical form about the Great Lakes and in the White Mts.; also introduced from Eu. Fig. 175. — The native form tends to have a strict narrow panicle, differing in this respect from the typical European plant. Var. HISPÍDULA Hack. *Lemmas hirsute.* — Sparingly introduced, N. Y. and Pa. (Eu.). Var. CAPILLÀTA (Lam.) Hack. *Lemma awnless; leaves very slender.* — Me. to N. J., Mich., and northw. (Nat. from Eu.) Var. BREVIFÒLIA (R. Br.) Hack. Culms 5–10 cm. high; sheaths closed; blades soft. — Calcareous cliffs, Nfd., e. Que., Vt., and northw. Var. DURIÚSCULA (L.) Koch. Leaf-blades thick, flattened, 0.7–1 mm. wide. — Sparingly introduced, Wis. and Ia. (Adv. from Eu.)

7. F. ELÀTIOR L. (TALLER OF MEADOW FESCUE.) Loosely tufted, often with short creeping rootstocks; culms erect, 5–12 dm. high, smooth; blades 1–6 dm. long, 4–8 mm. wide, scabrous above; panicle erect, 1–2 dm. long, contracted after blooming, *branches spikelet-bearing nearly to the base;* spikelets 9–11 mm. long; glumes lanceolate; lemma oblong-lanceolate, scabrous at the summit, the scarious apex acute, rarely short-awned. (*F. pratensis* Huds.) — Meadows and waste places, throughout the U. S. and s. Can. June–Aug. (Nat. from Eu.) Fig. 176.

176. F. elatior × 1½. Spikelet, floret, and base of lemma (opened).

8. F. nùtans Spreng. Culms solitary or few, erect, 4–12 dm. high; sheaths glabrous or pubescent; blades 1–3 dm. long, 4–7 mm. wide, scabrous, sometimes puberulent above; *panicle very loose*, 1–2 dm. long, usually subsecund, and more or less nodding, *branches spikelet-bearing near the ends*, at first erect, finally spreading; spikelets 3–5-flowered, 5–7 mm. long; glumes firm, the first 3 mm., the second 4 mm. long; lemma smooth, oblong-ovate, subacute, the narrow margin hyaline. — Moist woods and copses, N. S. to Minn., and southw. June, July. Fig. 177.

177. F. nutans. Spikelet × 3.

9. F. Shórtii Kunth. Similar to the preceding; *panicle more compact, the branches spikelet-bearing from about the middle;* the glumes slightly longer; the *lemma broader, more obtuse.* — Wet prairies, Ill., Ia., Kan., and southw.

10. F. GIGANTÈA (L.) Vill. Culms 6–12 dm. high; blades 1.2–4 dm. long, 5–15 mm. wide, paler and roughened on the upper surface, margins very scabrous; panicle 1–4 dm. long, at length spreading, somewhat drooping; *spikelets* 10–13 *mm. long*, 5–9-flowered; *glumes hyaline-margined; lemma* sparsely scabrous, *bidentate at the scarious apex, bearing an awn more than twice as long.* — Waste places, near the coast, Me. to N. Y., rare. (Adv. from Eu.)

76. BRÒMUS L. BROME GRASS

Spikelets few–many-flowered; glumes unequal, acute, 1–5-nerved; lemmas longer than the glumes, convex or sometimes keeled, 5–9-nerved, usually 2-toothed at the apex, awnless or awned from between the teeth or just below; palea a little shorter than the lemma, 2-keeled; grain furrowed, adnate to the palea. — Annuals, biennials, or perennials with flat leaves and terminal panicles of rather large spikelets. (An ancient name for the oat, from βρῶμα, *food.*)

Annuals or biennials.
  Lemma broadly elliptical; awn wanting or not over 1 cm. long.
    Awn, if present, straight.
      Sheaths glabrous . . . . . 1. *B. secalinus.*
      Sheaths pubescent.
        Awn about as long as the narrow lemmas.
          Panicle rather dense, erect . . . . . 2. *B. hordeaceus.*

Panicle open.
Lemma less than 7 mm. long.
Panicle 2–3 dm. long . . . . . 5. *B. arvensis.*
Panicle less than 1 dm. long . . . . . 3. *B. racemosus.*
Lemma 9–10 mm. long; panicle drooping . . . . . 4. *B. commutatus.*
Awn short or none; lemmas very broad . . . . . 6. *B. brizaeformis.*
Awn bent or twisted . . . . . 7. *B. japonicus.*
Lemma narrow; awn over 1 cm. long.
Panicle open, drooping.
Awn about 1.5 cm. long . . . . . 8. *B. tectorum.*
Awn 2–3 cm. long . . . . . 9. *B. sterilis.*
Panicle compact, ovoid, erect . . . . . 10. *B. rubens.*
Perennials.
Panicles large, open and drooping.
Sheaths shorter than the internodes.
Lemma smooth on the back, ciliate-pubescent along the margins . 11. *B. ciliatus.*
Lemma evenly pubescent all over . . . . . 12. *B. purgans.*
Sheaths longer than the internodes, much overlapping.
Sheaths sparsely pubescent except a conspicuous ring at summit . 13. *B. altissimus*
Sheaths densely pubescent . . . . . 14. *B. incanus.*
Panicles small, narrow, erect or nearly so.
First glume 3-nerved . . . . . 15. *B. Kalmii.*
First glume 1-nerved . . . . . 16. *B. erectus.*

§ 1. EUBRÒMUS Godron. *Annuals or biennials; glumes rather broad; lemmas broadly elliptical. Species all introduced.*

1. B. SECALÌNUS L. (CHEAT OF CHESS.) Culms 4–9 dm. high; *sheaths smooth and strongly nerved;* blades sparingly pilose above; *panicle open, its branches somewhat drooping;* spikelets 5–15-flowered, glabrous; glumes 5–7 mm. long; lemma 8–11 mm. long, becoming at maturity convex, thick and inrolled at the margins, awns short and rather weak. — Fields and waste places, common. — The florets are somewhat distant, so that, in side view, openings are visible along the rhachilla at the base of the florets. (Nat. from Eu.) FIG. 178.

178. B. secalinus. Spikelet × ½. Floret × 1½.

2. B. HORDEÀCEUS L. (SOFT CHESS.) Culms 1–6 dm. high; *whole plant more or less pubescent; panicle erect and contracted;* spikelets 6–10-flowered; *lemma* 9–10 *mm. long, softly pilose, awn about* 1 *cm. long.* (*B. mollis* L.) — Fields and waste places, infrequent, N. S. to Va. Var. LEPTÓSTACHYS (Pers.) Beck. *Spikelets glabrous or merely scabrous.* — Del. to D. C. (Adv. from Eu.)

3. B. RACEMÒSUS L. Culms 3–6 dm. high; *sheaths pubescent;* panicle short (not over 7 cm. long), upright; *spikelets* 5–8-flowered, *glabrous;* glumes 6–8 mm. long; *lemma* 7 *mm. long, with an awn about* 6 *mm. long.* — Waste places, Que. to Del., rare. (Adv. from Eu.)

4. B. COMMUTÀTUS Schrad. Differs from the preceding in having an *open drooping panicle as much as* 1.5 *dm. long*, and usually longer awns. — Waste places throughout, especially in the East. — Florets more closely imbricated than in *B. secalinus*, so that in side view no openings are seen at base of florets; lemmas thinner and not inrolled at the margins. (Adv. from Eu.)

5. B. ARVÉNSIS L. Culms 3–9 dm. high, erect or geniculate at the base; *sheaths pubescent; panicle large, open, with long drooping branches;* glumes 4.5–6 mm. long; lemma 7–8 mm. long, smooth or minutely scabrous; awn about as long, straight or slightly bent. — O. (*Stair*) and Mo. (*Bush*). (Adv. from Eu.)

6. B. BRIZAEFÓRMIS Fisch. & Mey. Culms 1–4 dm. high; panicle open and drooping; *spikelets broadly ovate,* the larger as much as 2 cm. long and 1.3 cm. wide, *awnless.* — Mass. to Del., Mich., and Ind. (*C. P. Smith*); rare. (Adv. from Eu.)

7. B. JAPÓNICUS Thunb. Culms 1.5–6 dm. high; panicle open and drooping, one-sided; *spikelets linear*, 2.5 cm. long, 6–12-flowered; lemmas glabrous, 9 mm. long, *with a bent or twisted awn about* 12 *mm. long.* (*B. patulus* Mertens & Koch.) — Near Boston, Mass. (*Swan*); Lafayette, Ind. (*Dorner*). (Adv. from Eu.)

§ 2. STENOBRÒMUS Griseb. *Annuals or biennials, with narrow glumes and lemmas and long awns. Introduced.*

8. B. TECTÒRUM L. Culms slender, tufted, 3–6 dm. high; sheaths and blades pubescent; *panicle broad, rather dense, secund, drooping*, 6–15 *cm. long; spikelets* 13–20 *mm. long*, nodding; lemma pubescent; awn 13–15 mm. long. — Waste places, Me. to Ill., and southw. (Nat. from Eu.) FIG. 179.

179. B. tectorum. Spikelet × 1.

9. B. STÉRILIS L. Similar to the preceding, sometimes less pubescent; culms usually taller and geniculate at base; *panicle* 1–2 *dm. long, broad, lax, drooping, the slender branches usually bearing but one spikelet; spikelets* 2.5–3.5 *cm. long*, drooping; *lemma scabrous or scabrous-puberulent; awn* 2–3 *cm. long.* — Waste places and river banks, Mass. to D. C., O., and Ill.; also on Pacific coast. June. (Nat. from. Eu.)

10. B. RÚBENS L. *Panicle erect, compact, ovoid, usually purplish*, 4–7 *cm. long;* awns about 2 cm. long. — Waste ground, N. Billerica, Mass. (*Swan*); introduced on Pacific coast. (Adv. from Eu.)

§ 3. ZÉRNA (Panzer) Ledeb. *Short-lived erect perennials, with weak drooping panicles and more or less pubescent florets. Nearly all native.*

11. B. ciliàtus L. Culms rather slender, 7–12 dm. high; sheaths retrorsely pubescent or nearly smooth; *blades* 2.5–3.5 *dm. long*, 1 cm. wide, *typically sparse pilose on both surfaces*, but sometimes almost smooth; panicle broad lax and drooping, about 1.5–2.5 dm. long, branches spikelet-bearing near the ends; *spikelets* 5–9-*flowered*, 1.5–2.2 *cm. long; glumes narrow, smooth; lemmas* 10–12 mm. long, *smooth on the back, ciliate-pubescent along the margins*, distinctly 3-nerved or faintly 5–7-nerved, obtuse and slightly bifid at the apex; awn straight, 3–5 mm. long. — Moist woods and banks, Nfd. to N. Y., w. to Man. and Minn. July, Aug. FIG. 180.

180. B. ciliatus × ¾. Spikelet and lemma.

12. B. púrgans L. Culms rather stout, 7–14 dm. high; sheaths, at least the lower, usually sparsely retrorse-pilose; *blades* 1.5–3 *dm. long*, 5–15 mm. wide, *pubescent on the nerves above or smooth;* panicle large, lax, nodding; *spikelets mostly* 7–11-*flowered*, 2–2.5 *cm. long; glumes sparsely pubescent; lemmas* 10–12 mm. long, acute or subacute, *densely pubescent all over*, distinctly 5-nerved, or another pair of nerves showing at maturity, emarginate; awn straight, 4–6 mm. long. (*B. ciliatus*, var. Gray.) — Moist rocky woodlands, w. N. E. to Fla., w. to Wyo. and Tex.

13. B. altíssimus Pursh. Differs from the preceding in having overlapping sheaths, *furnished at the summit with a pubescent ring*, otherwise sparsely pubescent, and in having *broader and distinctly* 7-*nerved lemmas, the pubescence more silky and increasing in density toward the base.* (*B. purgans*, var. *latiglumis* Shear.) — Wooded hills, Ct. to Pa., w. to Mont. and Mo.

181. B. Kalmii. Spikelet × 1.

14 B. incànus (Shear) Hitchc. Similar to the preceding, *sheaths densely and softly short-pilose;* spikelets much as in *B. purgans*, but flowering later than that species, with which it is associated. (*B. purgans*, var. Shear.) — Wooded hills, Pa. to Va., S. Dak., and Tex.

15. B. Kálmii Gray. (WILD CHESS.) Culm slender, 0.5–1 m. high; sheaths and blades conspicuously or sparingly villous; panicle 7–10 cm. long; *spikelets* drooping on capillary peduncles, closely 7–12-flowered, 1.5–2.5 cm. long, *densely silky all over; first glume distinctly* 3-*nerved, the second* 5-*nerved;* lemma 8–10 mm. long, 7-nerved, obtuse; awn straight, 2–3 mm. long. — Dry ground, w. N. E. to Pa., Mo., Minn., and northw. June, July. FIG. 181.

16. B. ERÉCTUS Hnds. *Culms* erect, 6–9 dm. high, *glabrous; sheaths nearly glabrous;* blades narrowly linear, sparingly pilose; *panicle* 1–2 dm. long, *with few ascending branches;* spikelets narrow; *first glume* 1-*nerved, second* 3-*nerved;*

lemma 10–12 mm. long, *acuminate, 5–nerved, evenly scabrous-pubescent* on back; *awn 5–6 mm. long.* — Fields, Me. to Ont., local. (Adv. from Eu.)

77. LÒLIUM L. Darnel

Spikelets several-flowered, solitary in alternate notches of the continuous rhachis, one edge of each spikelet placed against the rhachis, the glume on that edge wanting; second glume rigid, 5–7-nerved, exceeding the lowest floret; rhachilla flattened; lemmas convex, 5–7-nerved, nerves converging above, awned or awnless; grain adherent to the palea. — Annuals or perennials with simple erect culms, flat leaves and terminal spikes. (Ancient Latin name.)

182. L. perenne. Two spikelets × 1½.

1. L. perénne L. (Common D., Perennial Ray or Rye Grass.) Short-lived *perennial;* culms 3–6 dm. high, glabrous; the axis of inflorescence glabrous except the angles; leaves usually not over 4 mm. wide, folded in the bud; *glume shorter than the 8–10-flowered spikelet; lemma about 5–6 mm. long, awnless.* — Fields and roadsides, chiefly eastw. June. — This and the following are cultivated as meadow grasses. (Nat. from Eu.) Fig. 182.

183. L. temulentum. Spikelets × ½. Floret × 1¼.

2. L. multiflòrum Lam. (Italian Rye Grass.) Differs from the preceding in having the upper portion of the culm and the convex side of the axis of inflorescence roughened; leaves convolute in the bud; *spikelets 10–20-flowered; lemmas 7–8 mm. long, usually at least the upper awned.* (*L. italicum* R. Br.) — Fields and roadsides. June. (Nat. from Eu.)

3. L. temuléntum L. (Bearded D.) *Annual;* culms taller; *glume fully equaling the 5–7-flowered spikelets; awn longer or shorter than the lemma.* — Grain fields and waste places, rare. (Adv. from Eu.) Fig. 183.

L. festucàceum Link, a glabrous perennial with *approximate spikelets*, or the lower remote, the glume shorter than the awnless florets, occurs occasionally on ballast and waste grounds in N. J and Wilmington, Del. (Adv. from Eu.)

78. LEPTÙRUS R. Br.

Spikelets 1–2-flowered, awnless, solitary, alternate in excavations of the articulate rhachis; glumes equal, placed edge to edge in front of the florets, except in the terminal spikelet, coriaceous, rigid, 5-nerved, acute; lemma much smaller than the glumes, hyaline, keeled. — Our species a low branching annual, with slender cylindrical straight or curved terminal spikes which disarticulate at maturity, the joints falling with the appressed spikelets attached. (Name from λεπτός, *narrow*, and οὐρά, *tail*, or *spike*.)

184. L. filiformis × 3. Part of inflorescence and spikelet.

1. L filifórmis (Roth) Trin. Tufted, 1–2 dm high, decumbent at base, glabrous; leaves short and narrow; spikes 3–10 dm. long, included at the base in the sheath, joints and spikelets 5 mm. long. — Borders of brackish marshes, Md. and Va.; and on ballast northw. (Adv. from Eu.) Fig. 184.

79. AGROPÝRON Gaertn.

Spikelets 3–many-flowered, solitary (rarely in pairs) in alternate notches of the continuous (rarely articulate) rhachis, the side of the spikelet placed against the rhachis; glumes equal, opposite or placed edge to edge on the outer side

of the spikelet, usually subcoriaceous and rigid, several-nerved, usually shorter than the florets, acute or awned; lemmas convex or slightly keeled above, 5–7-nerved, acute or awned from the apex; palea shorter than its lemma, bristly-ciliate on the keels; grain pubescent at the summit, usually adherent to the palea. — Perennials with simple culms and terminal spikes. (Name from ἀγρός, *a field*, and πυρός, *wheat*.)

Culms solitary or few, erect from creeping rootstocks.
- Lemmas densely pubescent . . . . . 4. *A. dasystachyum.*
- Lemmas glabrous or scabrous.
  - Leaves flat, thin, with fine scarcely prominent nerves . . . . . 3. *A. repens.*
  - Leaves becoming involute, thick, with prominent thick nerves.
    - Glumes faintly nerved, long-acuminate . . . . . 1. *A. Smithii.*
    - Glumes strongly nerved, abruptly narrowed to a rather blunt point 2. *A. pungens.*

Culms tufted; no creeping rootstocks.
- Awn not longer than the lemma.
  - Glumes thin, widened above the middle . . . . . 5. *A. biflorum.*
  - Glumes firm, narrowed from below the middle . . . . . 6. *A. tenerum.*
- Awn about twice the length of the lemma.
  - Spike nodding, symmetrical . . . . . 7. *A. caninum.*
  - Spike erect, one-sided . . . . . 8. *A. Richardsonii.*

1. A. **Smíthii** Rydb. (Blue-joint.) Glaucous; culms rigid, 3–15 dm. high; *leaves rigid, bluish green*, scabrous, becoming involute, 1–2 dm. long, 4–6 mm. wide, basal leaves longer; spikes 0.8–1.5 dm. long; spikelets 7–13-flowered, 1.2–2 cm. long, usually somewhat distant, *glabrous* or nearly so, *acute, compressed, divergent*, sometimes in pairs; glumes acuminate, ½ or ⅔ as long as spikelet, nerves usually faint; *lemmas mucronate or awn-pointed, hard, faintly nerved.* (*A. occidentale* Scribn.; *A. spicatum* Scribn. & J. G. Sm., as to description, not *Festuca spicata* Pursh.) — Prairies, Mich. to Kan., and westw. July. — Rootstock and lower portion of culms gray or tawny, not bright yellow-green as in *A. repens.* Fig. 185.

185. A. Smithii
Spikelet × 3.

2. A. pungens (Pers.) R. & S. Glaucous; culms slender, rigid, 6–9 dm. high; *leaves* 18–24 cm. long, *narrowed into a rigid involute point;* spikes 1–1.2 dm. long, flattened parallel to the rhachis; the *broad compressed spikelets along each side of the rhachis, overlapping, usually alternately diverging to the right and left, thus appearing 4-ranked*, 7–11-flowered, 1.5–2 cm. long; glumes abruptly narrowed to a blunt point, 8–9 mm. long; lemmas about 1 cm. long, acute, mucronate or very short-awned. (*A. tetrastachys* Scribn. & J. G. Sm.) — Sandy seacoast of Me. July. (Nat. from Eu.)

186. A. repens.
Spikelets × ⅔.
Floret × 1½.

3. A. rèpens (L.) Beauv. (Couch, Quitch, or Quick Grass.) Bright green or glaucous, 3–12 dm. high; sheaths glabrous or the lower sparsely pilose; *blades flat or inrolled*, scabrous or sparsely pilose above; spikes 0.5–1.5 dm. long, slender or stout; *spikelets about 5-flowered*, 1–1.5 cm. long; glumes 8–10 mm. long, acuminate or awn-pointed, strongly nerved; *lemmas* about 1 cm. long, glabrous or more or less scabrous, *strongly nerved*, pointed or terminating in an awn as much as 5 mm. long. — Fields, roadsides and waste places, common. — The internodes of the long creeping rootstock and the lower portion of the culm are colored bright greenish yellow; scales of the rootstock distant and often conspicuous. (Nat. from Eu.) Fig. 186.

4. A. **dasystàchyum** (Hook.) Scribn. Resembling the last, glaucous; *leaves* narrow and *often involute;* the 5–9-flowered usually subterete *spikelets densely downy-hairy all over* except the strongly nerved glumes; lemmas thinner with scarious margins, mostly long-acuminate. — Sandy shores of Lakes Huron and Michigan, and northw. Aug.

5. A. **biflòrum** (Brignoli) R. & S. Culms usually decumbent at base, 3–6 dm.

high; leaves often lax, 2–5 mm. wide; *spike dense*, 5–10 cm long, *usually tinged with purple;* glumes conspicuously 5–7-nerved, *the margins thin and widened above the middle*, rather abruptly *narrowed into a short awn;* lemma 8–10 mm. long, glabrous or nearly so, terminating in an awn shorter than itself. (*A. violaceum* Lange.) — Alpine regions of the White Mts., L. Superior, northw. and westw. June–Sept. (Eu.) Fig. 187.

187. A. biflorum. Spikelet × 3.

188. A. tenerum. Spikelet × 3.

6. **A. ténerum** Vasey. Culms erect, 5–10 dm high, rigid; leaves subrigid, narrow, flat or involute in drying; *spike* usually almost cylindrical, *green or straw-color*, 1–1.5 dm. long; *glumes firm, nearly as long as the spikelet, the scarious margin narrow, tapering more gradually into the awned point;* lemma short-awned. — Nfd. to Pa. and Minn., and common in the far West. July, Aug. — The typical form has slender spikes with rather distant spikelets, which are nearly inclosed in the glumes; this is common westw. and extends into Minn.; also introduced on the coast of Mass. (*Eaton.*) Fig. 188. Passing into a form with stouter and denser spikes and broader less rigid leaves which extends eastw. to Nfd. and N. E.; this is *A. novae-angliae* Scribn. and essentially *A. pseudorepens* Scribn. & J. G. Sm.

189. A. caninum. Spikelet × 1½.

7. **A. canìnum** (L.) Beauv. (Awned Wheat Grass.) Culms erect, 3–10 dm. high; leaves flat, rather lax, 8–20 cm. long, 2–6 mm. wide, scabrous; *spike more or less nodding*, at least in fruit, rather dense, 7–15 cm. long; spikelets 1.2–1.5 cm. long excluding the awns; glumes pointed or awned; lemmas 3–5-nerved; *awns* straight or somewhat spreading, *fully twice the length of the lemma.* — Sparingly naturalized in cultivated grounds and meadows; indigenous along our northern borders, and westw. July–Sept. (Eu.) Fig. 189.

8. **A. Richardsònii** Schrad. Similar to the preceding; culms usually taller and stouter; *spike larger, as much as 2 dm. long, erect, 1-sided; spikelets 2 cm. long*, excluding the *awns*, which are *often as much as 3–4 cm. long.* — Prairies and shores, e. Que.; Minn., Ia., and northwestw. June–Sept.

80. HÓRDEUM [Tourn.] L. Barley

Spikelets 1 (rarely 2)-flowered, 3 together in our species at each joint of the flattened articulate rhachis, the middle one sessile, perfect, the lateral pair usually pediceled, often reduced to awns and together with the glumes of the perfect spikelet simulating a bristly involucre at each joint of the rhachis; rhachilla prolonged behind the palea as an awn, sometimes with a rudimentary floret; glumes equal, rigid, narrow-lanceolate subulate or setaceous, placed at the sides of the dorsally compressed floret which is turned with the back of the palea against the rhachis of the spike; lemma obscurely 5-nerved, tapering into an awn; palea slightly shorter, the 2 strong nerves near the margin; grain hairy at the summit, usually adherent to the palea at maturity. — Caespitose annuals or perennials with terminal spikes which disarticulate at maturity, the joints falling with the spikelets attached. (The ancient Latin name.)

190. H. jubatum. Three spikelets × 1. Middle, fertile spikelet × 1½.

1. **H. jubàtum** L. (Squirrel-tail Grass). *Biennials*, 3–7 dm. high, erect or geniculate at base; leaves 5 mm. wide or less, scabrous; *spike nodding, 5–12 cm. long, about as*

wide; lateral pair of spikelets each reduced to 1–3 spreading awns; *glumes* of perfect spikelets awn-like, 3–6 *cm. long*, spreading; lemma 6–8 mm. long, with an awn as long as the glumes; all the awns very slender, scabrous. — Coast, Lab. to N. J.; prairies and waste ground, Ont. to Ill., Kan., and westw. June–Aug. — Often a troublesome weed. (Eurasia.) Fig. 190.

191. H. pusillum. Three spikelets × 3.

2. **H. pusillum** Nutt. *Annual*, 1–4 dm. high; *leaves* 6 cm. or less long, *erect*, scabrous; *spikes erect*, 2–7 *cm. long*, 1–1.5 *cm. wide;* lateral pair of spikelets abortive; *first glume of each, and both glumes of fertile spikelet, dilated above the base*, attenuate into a slender awn 8–15 mm. long, equaling the awned lemma. — Plains, especially in saline soil, O. to Mo., and westw.; sparingly introduced, D. C., Va., and southw. along the coast. May, June. Fig. 191.

192. H. nodosum. Three spikelets × 3.

3. **H. nodosum** L. Similar to the preceding, usually taller; spike 2–8 cm. long, about 1.5 cm. wide; *all the glumes awn-like*, 1–1.5 mm. long. — Thin dry soils, Ind., Minn., and northw., s. to Tenn. and Tex. (Eurasia.) Fig. 192.

4. **H. Pammèli** Scribn. & Ball. *Perennial*, erect or geniculate at base, 6–10 dm. high; leaves 1.2–2 dm. long, 5–8 mm. wide, long-acuminate, scabrous; spikes nodding, 8–17 cm. long, 2–3 cm. wide; *the lateral pair of spikelets nearly sessile, perfect; the middle spikelet 2-flowered or often with the rudiment of a third floret; glumes 2.3–3.5 cm. long, subulate-attenuate into slender awns.* — Prairies, Ill., Ia., S. Dak., and Wyo. June–Aug. — Intermediate between *Hordeum* and *Elymus;* closely related to cultivated barley.

81. ÉLYMUS L. Wild Rye, Lyme Grass

Spikelets 2–6-flowered (uppermost florets imperfect), in pairs (sometimes solitary below, rarely in 3's or 4's), sessile at the alternate notches of the continuous rhachis; rhachilla articulated above the glumes and between the florets; glumes equal, rigid, narrow, 1–3-nerved, acute or awn-pointed, placed edge to edge in front or toward the sides of the florets (which are dorso-ventral to the rhachis of the spike) simulating an involucre at each joint of the rhachis; lemmas convex, obscurely 5-nerved, obtuse, acute or awned from the apex; paleas a little shorter than their lemmas; grain hairy at the summit, adherent to the lemma and palea. — Erect tufted perennials with flat leaves and closely flowered terminal spikes. (Name from ἑλύειν, *to roll up*, an ancient one for some grain.)

Glumes as long as the florets or nearly so.
- Lemmas awned.
  - Spikelets spreading.
    - Glumes awl-shaped . . . . . 6. *E. striatus.*
    - Glumes narrowly lanceolate.
      - Glumes indurated below; spike erect.
        - Awn long and spreading . . . . . 2. *E. australis.*
        - Awn short and erect . . . . . 1. *E. virginicus.*
      - Glumes not indurated below; spike nodding.
        - Spike large and densely flowered throughout . . . . 4. *E. robustus.*
        - Spike more slender and less densely flowered, interrupted below.
          - Lemma hirsute . . . . . 3. *E. canadensis.*
          - Lemma minutely scabrous . . . . . 5. *E. brachystachys.*
  - Spikelets appressed to rhachis.
    - Spikelets in pairs . . . . . 8. *E. glaucus.*
    - Spikelets mostly solitary . . . . . 7. *E. Macounii.*
- Lemmas awnless . . . . . 9. *E. arenarius.*

Glumes reduced to short awns . . . . . 10. *E. diversiglumis.*

** Glumes as long as the lemmas or nearly so.*

+ Glumes and lemmas rigid, all or only the latter awned.

++ Glumes bowed out, the base yellow and indurated for 1–2 *mm.*

1. **E. virgínicus** L. Green or glaucous; culms stout, 6–10 dm. high; sheaths smooth or hairy; blades 1.5–3 dm. long, 4–8 mm. wide, scabrous; spike 4–14 cm. long, 12 mm. thick, rigidly upright, often included at the base in the upper sheath; spikelets 2–3-flowered; the lemmas smooth, bearing a scabrous awn 4–18 mm. long, exceeding the lanceolate strongly-nerved awn-pointed *glabrous glumes.* — River banks, moist woodlands, etc., N. S. to Fla., and westw. July–Sept. — In the Linnean specimen the spike is exserted and the awn is about the length of the lemma. Fig. 193. Var. HIRSUTIGLÙMIS (Scribn.) Hitchc. *Glumes and lemmas hirsute*, glumes somewhat narrower; spike usually more slender. — Me. to Va. and Neb. Var. SUBMÙTICUS Hook. Lemma and glumes awnless or short awn-pointed, scabrous. — O. to Minn., Kan., and westw.

193. E. virginicus. Two spikelets × 1. Spikelet with glumes detached × 2. Floret × 2.

++ ++ Glumes straight, not or but little indurated at base.

= Culms stout; spikes 1–2 cm. thick.

2. **E. austràlis** Scribn. & Ball. Intermediate between *E. virginicus* and the next, *green;* culms 0.7–1.5 m. high, rather slender; *leaves* 2–4 dm. long, *narrowed toward the base; spike* exserted, *erect*, 8–14 cm. long, 1.5–2 *cm. thick;* glumes and lemmas hirsute; awns spreading, often 2 cm. long. — Woods and prairies, Ct. to Mo., and southw. — Glumes slightly indurated at base.

194. E. canadensis × ⅔. Two spikelets. Spikelet with glumes detached.

3. **E. canadénsis** L. Green or glaucous; culms 6–15 dm. high; leaves often 1–2 cm. broad; *spike* 1–2 dm. long, exserted, soon nodding, *loose or interrupted below; glumes and lemmas hirsute*, with long spreading awns. — Sandy soil, N. S. to Man., and southw. Fig. 194. Var. GLAUCIFÒLIUS (Muhl.) Gray is the very glaucous form but corresponds more nearly with the Linnean type.

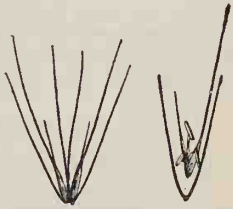
4. **E. robústus** Scribn. & J. G. Sm. Differs from the preceding in having a more robust and densely flowered spike; *spikelets closely imbricated, not interrupted at base;* the long awns divaricately spreading. — Low prairies, Ill., and westw.

5. **E. brachýstachys** Scribn. & Ball. Resembles small specimens of *E. canadensis;* culms 3–9 dm. high; leaves 1–2 dm. long, 6–10 mm. wide, often somewhat involute, scabrous; *spike* rather dense, or loose below, somewhat nodding, 8–15 *cm. long; glumes and florets scabrous only, not hirsute; awns divergent.* — Moist open or shaded grounds, Md. to Mich., S. Dak., and Mex

= = Culms slender.

a. Spikelets spreading.

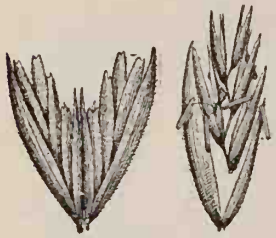
6. **E. striàtus** Willd. More or less pubescent; culms 5–10 dm. high; leaves 15–20 cm. long, pubescent on the upper surface; spike 7–10 cm. long, about 2.5 cm. thick, dense, usually nodding; spikelets 1–2(rarely 3)-flowered; *glumes awl-shaped, hispid or hirsute*, 2 *or* 3 *times the length of the hirsute floret which is only* 6 *mm. long, excluding the capillary awn* (2–3 *cm. in length.*) — Rocky woods and banks, Me. to S. Dak., s. to N. J. and Ark. July, Aug. Fig. 195. Var. ARKANSÀNUS (Scribn. & Ball) Hitchc. *Glumes and lemmas glabrous or minutely scabrous.* — Md., Ia., and southw.



195. E. striatus × ⅔. Two spikelets. Spikelet with glumes detached

a a. Spikelets appressed to the rhachis.

7. **E. Macoúnii** Vasey. Culms 3–8 dm. high; sheaths glabrous or the lower parsely pilose; *blades* 8–16 *cm. long*, 4 *mm. wide or less*, erect, often involute in drying, scabrous, the lower usually pilose on the upper surface; spikes narrow, 6–10 cm. long; *spikelets* 1–3-*flowered, the lower solitary and often apparently with* 3 *glumes, the missing spikelet being reduced to a single glume;* glumes linear-lanceolate, 3-nerved, scabrous, tapering into an awn; lemmas 8–10 mm. long, scabrous above, with a slender awn 6–10 mm. long. — Prairies, Minn., Ia., and westw.



196. E. arenarius × ⅔.
Two spikelets.
Spikelet with glumes detached.

8. **E. glaúcus** Buckley. Glabrous; culms 5–10 dm. high; *leaves* 1.5–2 *dm. long*, 4–8 *mm. wide*, rather thin, flat, scabrous; *spikes slender, the internodes* 8–10 *mm. long; spikelets* 3–6-*flowered; glumes* linear-lanceolate, 3–5-nerved, smooth or scabrous on the nerves, *short-awned, shorter than the nearly smooth lemma which bears an awn twice its own length.* — Moist soil, Ont. to Mich., and westw. July, Aug.

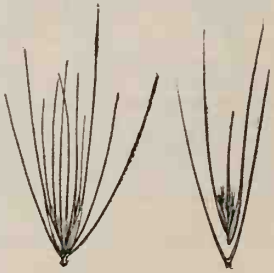
+ + Glumes and lemmas not rigid, awnless; plants reed-like.

9. **E. arenàrius** L. Culms stout, 6–12 dm. high, from *extensively creeping rootstocks;* leaves firm, setaceous-involute toward the ends, the basal ones crowded, 2–3 cm. long, the upper shorter; spike stiff, dense, 8–25 cm. long, 1.5–2 cm. thick; spikelets in pairs or solitary, 3–7-flowered, 2.5–3 cm. long, often glaucous; glumes and lemmas acuminate or mucronate, short-villous. (*E. mollis* Trin.) — Maritime sands, Lab. to Me.; and shores of the Great Lakes. (Eurasia.) Fig. 196.

** * Glumes reduced to short awns.*

10. **E. diversiglùmis** Scribn. & Ball. Culms stout, 9–12 dm. high; leaves lax, 1.5–2.5 dm. long, 6–12 mm. wide, scabrous, setaceous-pointed; spike loose below, 1–1.5 dm. long; spikelets 2-flowered; glumes subulate, scabrous, varying from a mere point to 1.5 cm. long in the same spike; florets 8–10 mm. long, hirsute, especially toward the summit, with a divergent awn 2–3 cm. long. — Thickets and open woods, Wis., Minn., and westw. — Approaches *Hystrix*.

Sitànion longifòlium J. G. Sm., a western tufted perennial 3–5 dm. high, with crowded basal sheaths, long spreading upper leaves, partially included loose long-awned disarticulating spikes about 1 dm. long, the glumes divided to the base into 2 long divergent awns (6–8 cm. long), occurs in central Kan. and westw. and is reported from central Minn. Fig. 197.



197. S. longifolium × ⅔.
Two spikelets.
Spikelet with glumes detached.

82. HÝSTRIX Moench. Bottle-brush Grass

Spikelets 2–4-flowered, on very short pedicels, 1–3 together at each joint of the flattened continuous rhachis, facing it as in *Elymus*, widely divergent at maturity; glumes reduced to short or minute awns, the first usually obsolete, both often wanting in the upper spikelets; lemmas convex, rigid, tapering into a long awn; palea strongly 2-keeled; grain pubescent at the summit, free within the lemma and palea. — Perennials with simple culms, flat leaves and loosely flowered spikes. (Name from ὕστριξ, a *hedgehog*, alluding to the bristly spikes.)

1. **H. pátula** Moench. Culms 6–12 dm. high; leaves spreading, 1–2 dm. long, 8–15 mm. wide, tapering to both ends, scabrous; spike short-exserted or partially included, 6–12 cm. long; *spikelets* usually distant, at first erect, *soon widely diverging*, 1–1.5 cm. long excluding the awns; lemmas pubescent at least at the summit or nearly glabrous; awns 1.5–4 cm. long. (*Asprella* Willd.; *H. Hystrix* Millsp.) — Moist woods, N. B. to Minn., and southw. June–Aug. Fig. 198.

198. H. patula. Spikelet × 1. Floret × 1½.

83. ARUNDINÀRIA Michx. Cane

Spikelets 2–many-flowered, perfect or the upper imperfect, laterally compressed, in racemes or panicles; glumes unequal, shorter than the lemmas, the first sometimes obsolete; lemmas firm, keeled, many-nerved, acute or mucronate; paleas nearly as long as their lemmas, 2-keeled and several-nerved; lodicules 3; styles 2 or 3; grain free within the lemma and palea. — Arborescent or shrubby grasses with terminal and lateral panicles of large spikelets. (Name from *arundo*, a reed.)

1. **A macrospérma** Michx. (Large C.) *Culms arborescent*, 3–10 *m. high* and 1–7 cm. thick at base, rigid, simple the first year, branching the second, afterwards fruiting at indefinite periods; leaves lanceolate, 2–5 cm. long, 1.5–3 cm. wide, smoothish or pubescent, the sheath ciliate on the margin, fimbriate at the summit; panicle lateral, composed of few simple unequal racemes; spikelets 3–5 cm. long, 5–15-flowered, purplish or pale, erect. — River banks, s. Va., Ky., and southw., forming cane brakes. Apr. Fig. 199.

199. A. macrosperma. Spikelet × ½. Floret × ⅔.

2. **A. técta** (Walt.) Muhl. (Switch C., Small C.) *Lower and more slender*, 1–4 *m. high*, branching above; leaves 8–20 cm. long, 0.8–3 cm. wide, more tapering at base; panicles of few aggregated spikelets on long slender branches with rather loose sheaths, the blades very minute; spikelets 2.5–4 cm. long, 5–10-flowered. (*A. macrosperma*, var. *suffruticosa* Munro.) — Swamps, moist soil, or in water, Md., s. Ind., Ill., Mo., and southw. — Sometimes blooming several years in succession.

CYPERÀCEAE (Sedge Family)

Grass-like or rush-like herbs, with fibrous roots, mostly solid stems (culms), *closed sheaths, and spiked chiefly 3-androus flowers, one in the axil of each of the glume-like imbricated bracts* (scales, glumes), *destitute of any perianth, or with hypogynous bristles or scales in its place; the 1-celled ovary with a single erect anatropous ovule, in fruit forming an achene.* Style 2-cleft with the fruit flattened or lenticular, or 3-cleft and fruit 3-angular. Embryo minute at the base of the somewhat floury albumen. Stem-leaves when present 3-ranked. — A large, widely diffused family.

N. B. — In this family, unless otherwise noted, the figures representing the inflorescence or a portion of it are on a scale of ⅔, while those representing the achene or perigynium are on a scale of 2⅔. In a few cases a bit of the surface of the achene is shown on a scale of 10.

I. Flowers all perfect, rarely some of them with stamens or pistil abortive; spikes all of one sort.

Tribe I. SCÍRPEAE. Spikelets mostly many-flowered, with only 1 (rarely more) of the lower scales empty.

* Scales of the spikelet strictly 2-ranked, conduplicate and keeled.

Flowers destitute of bristles and of beak to the achene; inflorescence terminal.

1. **Cyperus.** Spikelets few–many-flowered, usually elongated or slender.
2. **Kyllinga.** Spikelets 1-flowered (but of 3 or 4 scales), glomerate in a sessile head.

+ + Flower furnished with bristles; achene beaked; inflorescence axillary.

3. **Dulichium.** Spikelets 6–10-flowered, slender, clustered on an axillary peduncle.

* * Scales of the several–many-flowered spikelet imbricated all round (subdisticbous in no. 5).

Achene crowned with the bulbous persistent base of the style; flowers without inner scales (bractlets).

++ Hypogynous bristles (periantb) generally present; culm naked.

4. **Eleocharis.** Spikelet solitary, terminating the naked culm. Stamens 2–3.

++ ++ Bristles always none; culm leafy.

5. **Dichromena.** Spikelets crowded into a leafy-involucrate head, laterally flattened, the scales more or less conduplicate and keeled. Many of the flowers imperfect or abortive.
6. **Psilocarya.** Spikelets in broad open cymes. Style almost wholly persistent.
7. **Stenophyllus.** Spikelets in an involucrate umbel. Style-base persistent.

+ + Achene not crowned by the bulbous base of the style.

++ Flowers without inner scales.

= Style-base bulbous, deciduous; periantb none.

8. **Fimbristylis.** Spikelets in an involucrate umbel. Culm leafy at base. Style wholly deciduous.

= = Style-base not thickened; periantb-bristles usually present.

9. **Scirpus.** Spikelets solitary or clustered, or in a compound umbel; the stem often leafy at base and inflorescence involucrate. Bristles 1–8, or none. Stamens 2 or 3.
10. **Eriophorum.** As *Scirpus*, but the silky elongate bristles very numerous. Stamens 1–3.

++ ++ Flower with one or more inner scales.

11. **Fuirena.** Scales of the spikelet awned below the apex. Flower surrounded by 3 stalked petal-like scales alternating with 3 bristles.
12. **Hemicarpha.** Flower with a single very minute hyaline scale next the axis of the spikelet. Bristles none.
13. **Lipocarpha.** Flower inclosed by 2 inner scales, one next the axis, the other in front of the achene. Bristles none.

Tribe II. RYNCHOSPÒREAE. Spikelets mostly 1–2-flowered, with 2–many of the lower scales empty.

14. **Rynchospora.** Spikelets terete or flattish; scales convex, either loosely enwrapping or regularly imbricated. Achene crowned with a persistent tubercle or beak, and commonly surrounded by bristles.
15. **Cladium.** Spikelets terete, few-flowered, the scales, etc., as in the preceding. Achene destitute of tubercle. No bristles.

II. Flowers unisexual.

Tribe III. SCLERÌEAE. Flowers monoecious; the staminate and pistillate in the same or in different clustered spikes. Achene naked, bony or crustaceous, supported on a hardened disk.

16. **Scleria.** Spikes few-flowered; lower scales empty. No bristles or inner scales.

Tribe IV. CARÍCEAE. Flowers monoecious in the same (androgynous) or in separate spikes, or sometimes dioecious. Achene inclosed in a sac (*perigynium*) or spathe.

17. **Kobresia.** Achene in the axil of a spathe-like glume.
18. **Carex.** Achene completely surrounded by the perigynium, the style protruding through a small aperture at the top.

1. CYPÈRUS [Tourn.] L. Galingale

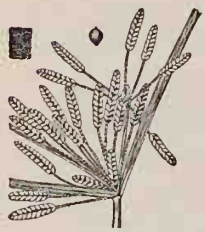
Spikelets many–few-flowered, mostly flat, variously arranged, mostly in clusters or heads, which are commonly disposed in a simple or compound terminal umbel. Scales 2-ranked (their decurrent base often forming margins or

wings to the hollow of the joint of the axis next below), deciduous when old. Stamens 1–3. Style 2–3-cleft, deciduous. Achene lenticular or triangular, naked at the apex. — Culms mostly triangular, simple, leafy at base, and with one or more leaves at the summit, forming an involucre to the umbel or head. Peduncles or rays unequal, sheathed at base. All flowering in late summer or autumn. (Κύπειρος, the ancient name.)

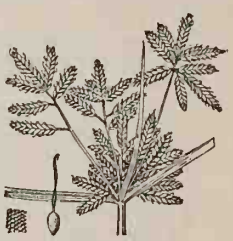
§ 1. Scales deciduous, readily falling away from the somewhat persistent rhachilla of the flattened spikelet *a*.
- *a*. Style 2-cleft; achene lenticular, laterally compressed (the edge turned to the rhachilla); rhachilla narrow, not winged; annuals *b*.
  - *b*. Achenes much shorter than the subtending scales *c*.
    - *c*. Achenes orbicular, with narrowly oblong superficial cells . . 1. *C. flavescens.*
    - *c*. Achenes obovate or narrower, the superficial cells broad *d*.
      - *d*. Achenes oblong-obovate *e*.
        - *e*. Spikelets lance-oblong; scales marked with dark brown or purple, or merely greenish.
          - Stamens 2; style-branches conspicuously exserted . . 2. *C. diandrus.*
          - Stamens 3; style-branches scarcely exserted . . . 3. *C. rivularis.*
        - *e*. Spikelets lance-linear; scales oblong, yellow or yellowish-brown throughout; stamens 2 . . . . . 4. *C. Nuttallii.*
      - *d*. Achenes linear-oblong or clavate; scales ovate or oblong.
        - Spikelets brownish, 1.5–2 mm. broad . . . . . 5. *C. microdontus.*
        - Spikelets greenish, about 1 mm. broad . . . . . 6. *C. Gatesii.*
  - *b*. Achenes nearly as long as the subtending scales . . . . 7. *C. flavicomus*
- *a*. Style 3-cleft; achene trigonous *f*.
  - *f*. Annuals *g*.
    - *g*. Scales tapering to recurved slender tips . . . . . 8. *C. Aristatus.*
    - *g*. Scales without recurved tips *h*.
      - *h*. Scales 2.5–3.5 mm. long . . . . . 9. *C. compressus.*
      - *h*. Scales 2 mm. or less long *i*.
        - *i*. Spikelets in globose heads; rhachilla wingless or only obscurely winged.
          - Spikelets green or whitish-brown, oblong; scales acute . 11. *C. acuminatus.*
          - Spikelets reddish-brown or purplish, linear; scales blunt or barely mucronate . . . . . 13. *C. fuscus.*
        - *i*. Spikelets in cylindric or elongate heads; rhachilla bearing freely deciduous scale-like wings . . . . . 19. *C. erythrorhizos.*
  - *f*. Perennials, the bases hardened and corm-like or stoloniferous *j*.
    - *j*. Scales strongly several-ribbed; achenes 2–3 mm. long.
      - Spikelets in oblong or narrowly obovoid heads . . . 10. *C. Schweinitzii.*
      - Spikelets in globose or subglobose heads . . . . . 34. *C. filiculmis.*
    - *j*. Scales faintly few-nerved or nerveless; achenes less than 2 mm. long *k*.
      - *k*. Culms naked or nearly so, the lower sheath nearly or quite bladeless . . . . . 14. *C. haspan.*
      - *k*. Culms leafy below *l*.
        - *l*. Plant not stoloniferous; rhachilla wingless; stamen 1 . . 12. *C. pseudovegetus.*
        - *l*. Plant loosely stoloniferous; scales decurrent on the rhachilla as wings; stamens 3 *m*.
          - *m*. Achenes short-obovoid; scales with free or spreading mucronate tips . . . . . 15. *C. dentatus.*
          - *m*. Achenes linear- to oblong-cylindric; scales appressed, blunt or barely mucronate *n*.
            - *n*. Scales chestnut-color.
              - Involucre shorter than the rays of the umbel, or 1 bract slightly longer . . . . . 16. *C. rotundus.*
              - Involucral bracts numerous and much overtopping the umbel . . . . . 17. *C. Hallii.*
            - *n*. Scales straw-color or pale brown . . . . . 18. *C. esculentus.*

§ 2. Rhachillas of the spikelets soon breaking away from the main rhachis; the scales falling only in extreme age *o*.
- *o*. Annuals.
  - Flowers remote, the successive scales not reaching the bases of the ones above on the same side . . . . . 21. *C. Engelmanni.*
  - Flowers approximate, the successive scales overlapping the bases of those above . . . . . 20. *C. ferax.*
- *o*. Perennials, with hard corm-like bases *p*.
  - *p*. Spikelets very strongly flattened . . . . . 22. *C. strigosus.*
  - *p*. Spikelets terete, subterete, or only slightly flattened *q*.
    - *q*. Spikelets reflexed, in thick cylindric or obovoid heads *r*.
      - *r*. Culms smooth and glabrous.
        - Spikelets loosely spicate; achenes 2.5–3 mm. long . . 23. *C. refractus.*
        - Spikelets densely spicate and overlapping; achenes less than 2.5 mm. long.
          - Spikelets 3–6-flowered, linear-cylindric, not rigid . . 24. *C. lancastriensis.*
          - Spikelets 1–2-flowered, subulate, rigid . . . . 25. *C. hystricinus.*

r. Culms scabrous, at least above.
Heads cylindric or subcylindric . . . . . 26. *C. dipsaciformis.*
Heads obovoid, conspicuously contracted at base . . . 27. *C. retrofractus.*
q. Spikelets spreading, or only the basal refracted in age, in globose or densely short-cylindric heads *s.*
s. Scales appressed, each distinctly overlapping the next above; spikelets 1–4-flowered *t.*
t. Heads mostly on distinct rays; achenes linear-oblong, 0.5 mm. broad *u.*
u. Spikelets very densely crowded and overlapping.
Heads globose or broadly obovoid . . . . . 28. *C. ovularis.*
Heads cylindric . . . . . 29. *C. cylindricus.*
u. Spikelets slightly crowded, the tips mostly divergent . 30. *C. echinatus.*
t. Heads all sessile in a glomerule; achenes ellipsoid or ovoid, 1 mm. broad . . . . . 31. *C. flavus.*
s. Scales not appressed; spikelets 5 (rarely 4)–15-flowered *v.*
v. Achenes narrowly obovoid or oblong, about half as broad as long.
Spikelets in dense heads; each successive scale reaching the middle of the one above on the same side . . 34. *C. filiculmis.*
Spikelets in loose heads; each successive scale reaching only the bases of the ones above on the same side . 32. *C. Grayii.*
v. Achenes trigonous-ovoid, two thirds as broad as long . . 33. *C. Houghtonii.*


200. C. flavescens.

1. **C. flavéscens** L. Culms 0.5–4 dm. high; involucre 3-leaved, very unequal; spikelets 0.5–1.5 cm. long, 1.5–2.5 mm. broad, becoming linear, obtuse, clustered on the 2–4 very short rays; *scales obtuse, straw-yellow; stamens* 3; *achene shining, orbicular, its superficial cells oblong.* — Low grounds, N. Y. to Mich., Ill., and southw. (Eurasia, Afr., Trop. Am.) Fig. 200.


201. C. diandrus.

2. **C. diándrus** Torr. Similar; *spikelets* lance-oblong, 0.5–1 *cm. long*, 2–3 mm. broad, rather *loosely flowered*, scattered or clustered on the 2–5 very short or unequal rays; *scales rather obtuse, with a narrow purple-brown margin or merely brown-flecked, thin and membranous; achene dull, oblong-obovate*, the superficial cells more or less quadrate; otherwise much like the last. — Low grounds, N. B. to Ont., Neb., and southw. Fig. 201.

202. C. rivularis.

3. **C. rivulàris** Kunth. Similar; the *densely flowered spikelets mostly* 1–2 *cm. long; scales firmer, subcoriaceous*, slightly lucid, with *broad brown margins*, or *brown all over*, or rarely pale; *style-branches slightly or not at all exserted.* (*C. diandrus*, var. *castaneus* Torr.) — Low ground, with the last or by itself. Fig. 202.

203. C. Nuttallii.

4. **C. Nuttállii** Eddy. Culms 0.5–3 dm. high; spikelets lance-linear, acute and very flat, 1–3 cm. long, 2–3 mm. broad, crowded on the few usually very short (or some of them obvious) simple rays; *scales oblong, yellowish-brown*, rather loose; *stamens* 2; *achene* oblong to *oblong-obovate* (0.6–0.8 mm. broad), bluntly pointed, minutely bullate and more or less reticulated, *dull.* — Mostly in brackish marshes, along the coast, from Me. to Fla. Fig. 203.

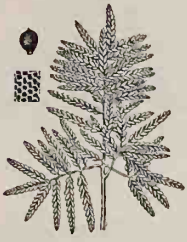
204. C. microdontus.

5. **C. microdóntus** Torr. Culms slender, 1–7 dm. high; leaves and somewhat spreading elongated bracts of involucre 1–4 mm. wide; spikelets few to many on the 4–8 rays, linear, acute, 0.8–3 cm. long, 1.5–2 mm. thick, the rhachis often branched; *scales thin, ovate or oblong, acute, closely imbri-*

cated, pale brown; stamens 2; *achene linear-oblong or clavate* (0.3–0.5 mm. broad), *short-pointed, grayish and minutely pitted.* (*C. polystachyus*, var. *leptostachyus* Boeckl.) — Shores, mostly near the coast, N. J. to Fla. and Tex. Fig. 204.

205. C. Gatesii.

6. **C. Gatèsii** Torr. Similar; very slender; leaves and *very long ascending involucral bracts* 1–2.5 *mm. broad;* spikelets 0.4–1.5 cm. long; the *oblong scales greenish;* achenes slightly smaller. — Low grounds, Va. to Fla., Ark., and Tex. Fig. 205.


206. C. flavicomus.

7. **C. flavícomus** Michx. Culm stout, 3–9 dm. high; leaves of the involucre 3–5, very long; spikelets linear, 0.7–2 cm. long, spiked and crowded on the whole length of the branches of the several-rayed umbel, spreading; *scales oval, very obtuse, yellowish and brownish, with a broad scarious whitish margin; stamens* 3; *achene obovate, mucronate,* blackish. — Low grounds, Va. to Fla. Fig. 206.

8. **C. aristàtus** Rottb. Dwarf (2–20 cm. high); involucre 2–3-leaved; *spikelets brown, oblong becoming linear,* 7–20-flowered, 3–10 mm. long, in 1–5 ovoid or subglobose heads (sessile and clustered, or short-peduncled); *scales nerved, tapering to a long recurved point;* stamen 1; achene oblong-obovate, obtuse. (*C. inflexus* Muhl.) — Sandy wet shores, local, N. B. to B. C., and southw. — Dry plant with odor of Slippery Elm. Fig. 207.

207. C. aristatus

208. C. compressus.

9. **C. compréssus** L. Culms 0.5–3.5 dm. high, with a simple sessile or a few umbellate clusters of oblong to linear spikelets (15–30-flowered and 0.7–2.5 cm. long), with *crowded strongly keeled and very acute greenish many-nerved scales;* stamens 3; achene obovoid, sharply trigonous. — Sterile fields along the coast, Pa. to Fla. and Tex. Fig. 208.

10. **C. Schweinítzii** Torr. *Perennial, propagating by hard clustered corms; culm rough on the angles* (2–8 *dm. high*); umbel 3–10-rayed, rays very unequal, erect; *spikelets loosely or somewhat remotely* 6–16-*flowered, with convex many-nerved* greenish-brown acute or acuminate *scales* (3.5–4.5 mm. long); joints of the rhachilla narrowly winged. — Dry sandy shores and ridges, w. N. Y. and e. Ont. to Man. and Kan. Fig. 209.

210. C. acuminatus.

11. **C. acuminàtus** Torr. & Hook. Slender (0.5–3.5 dm. high); involucre 2–3-leaved; *spikelets ovate, becoming oblong,* 16–30-flowered, *pale,* in globular heads; *scales obscurely 3-nerved, short-tipped;* stamen 1; achene oblong, pointed at both ends, much exceeded by the scale. — Low ground, Ill. to Dak., and southw. Fig. 210.

209. C. Schweinitzii.

211. C. pseudovegetus.

12. **C. pseudovégetus** Steud. *Tall* perennial (0.3–1 *m. high*); culm obtusely triangular; leaves and involucre very long, keeled; umbel compound, many-rayed; *spikelets ovate* (3–6 *mm. long*), *in numerous small greenish heads; achenes pale, linear,* on a slender stipe; scales narrow, acutish, obscurely

3-nerved. (*C calcaratus* Nees.) — Wet places, Del. to Fla. and Tex.; northw. in the flat country to Mo. and Kan. Fig. 211.

13. **C fúscus** L. Low (1–3 dm. high); *spikelets linear*, 3–8 mm. long, the *thin brown scales* (greenish only on the keel) *very faintly nerved;* stamens 2; achenes equaling the scales. — Locally on ballast, Mass. to N. J. (Adv. from Eu.) Fig. 212.

212. C. fuscus.

14. **C. háspan** L. Culms sharply angled (2–8 dm. high); leaves linear, often reduced to membranous sheaths; *umbel spreading, the filiform rays mostly longer than the 2-leaved involucre;* spikelets narrowly linear; *scales* light reddish-brown, oblong, *mucronate, 3-nerved;* wings of rhachilla persistently attached; achenes round-obovoid. — Ponds and ditches, Va. to Fla. and Tex. Fig. 213.

213. C. haspan.

15. **C. dentàtus** Torr. Perennial by slender rootstocks and tuber-bearing stolons; culms slender (1–6 dm. high); leaves rigid and keeled; *umbel erect, shorter than the 3–4-leaved involucre;* spikelets 5–13-flowered; scales reddish-brown, *with green keel*, ovate, *acute, 7-nerved*, the mucronate tips prominent. — Sandy shores, Me. to N. Y., and southw. — Spikelets often abortive and changed into leafy tufts. Fig. 214.

214. C. dentatus.

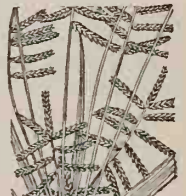
Var. **ctenóstachys** Fernald. Spikelets 15–40-flowered; scale-tips less prominent. — Mass. to N. J. Fig. 215.

215. C. dentatus, v. ctenostachys.

16. **C. rotúndus** L. (Nut Grass.) Perennial by tuber-bearing stolons; culm slender (1–6 dm. high), longer than the leaves; umbel simple or slightly compound, about equaling the involucre; the few rays each bearing 4–9 *dark chestnut-purple* 12–40-flowered *acute spikelets* (0.8–2.5 cm. long); *scales ovate, closely appressed, nerveless* except on the keel; achenes linear-oblong. — Sandy fields, Va. to Fla. and Tex.; also adv. near Phila. and N. Y. City. (Trop. and subtrop. regions.) Fig. 216.

216. C. rotundus.

17. **C. Hállii** Britton. Similar; *culm stout*, 4–9 dm. high, *scarcely exceeding the broad* (0.5–1 cm.) *leaves;* umbel compound, the numerous *rays much exceeded by the involucral bracts;* spikelets chestnut-purple, 1–1.5 cm. long; the acutish *scales distinctly nerved.* — Kan. to Tex.


217. C. esculentus.

18. **C. esculéntus** L. Similar; culms (3–9 dm. high) equaling the leaves; umbel often compound, 4–7-rayed, much shorter than the long involucre; *spikelets numerous, light chestnut or straw-color, acutish*, 0.5–1.5 cm. long; *scales ovate or ovate-oblong, narrowly scarious-margined, nerved*, the acutish *tips rather loose;* achene oblong-obovoid. — Low grounds, along rivers, etc.; spreading extensively by its small nut-like tubers and sometimes becoming a pest in cultivated grounds. (Eurasia.) Fig. 217.

218. C. esculentus, v. leptostachyus.

Var. **leptostachyus** Boeckl., with spikelets 1.8–3.5 cm. long, is less frequent. Fig. 218.

19. **C. erythrorhìzos** Muhl. Annual; culm obtusely triangular (1–8 dm. high); umbel many-rayed; involucre 4–5-leaved, very long; involucels bristle-form; *spikelets very numerous*, crowded in oblong or cylindrical nearly sessile heads, spreading horizontally, linear, *flattish* (3–10 *mm. long*), *bright chestnut-colored; scales lanceolate, mucronulate.* (*C. Halei* Britton, in part, not Torr.) — Alluvial banks, Mass. to Ont., Minn., and southw. Fig. 219. — Dwarf tufted plants are sometimes separated as Var. pùmilus Engelm.

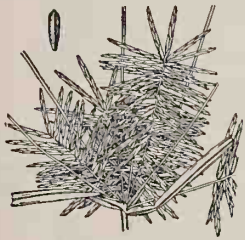
219. C. erythrorhizos.

220. C. ferax.

20. **C. fèrax** Rich. Culm stout, *mostly low* (0.3–8 dm. high); *rays of the simple or compound umbel mostly all short and crowded; spikelets* 10–20-*flowered, yellowish-brown or drab* at maturity (0.5–1.8 cm. long), the short joints of its axis winged with very broad scaly margins which embrace the *ovoid-triangular achene; the firm scales ovate, obtusish, overlapping.* (*C. speciosus* Vahl.) — Low grounds and sandy banks, Mass. to Fla., w. to Ont., Minn., and Tex.; Cal. (Trop. regions.) Fig. 220.

21. **C. Engelmánni** Steud. Similar; but the *spikelets more slender* and terete, *somewhat remotely* 5–15-*flowered*, the zigzag joints of the axis slender and narrowly winged, and the oblong or oval broadly scarious *scales proportionally shorter, so as to expose a part of the axis of each joint;* achene oblong-linear, very small. — Low grounds, Mass. to Wisc., and southw. Fig. 221.

221. C. Engelmanni.


222. C. strigosus.

22. **C. strigòsus** L. Perennial, with hard corm-like tubers; culm 0.1–1 m. high; leaves flat, soft; most of the rays of the simple or compound umbel elongated, their sheaths 2-bristled; *spikelets several-flowered*, 0.7–1.8 cm. long, spreading, *in loose heads;* scales oblong-lanceolate, appressed, several-nerved, much longer than the linear-oblong achene. — Damp or fertile soil, Me. to Ont., Minn., southw. and westw. Fig. 222. — Very variable; dwarf plants with the rays scarcely developed are Var. capitàtus Boeckl.

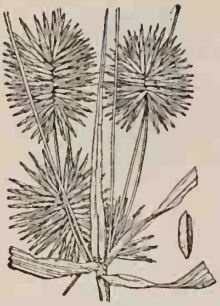
Var. **robústior** Kunth. Spikelets 2–3 cm. long. — Local, Mass. to Fla. and Mo.

Var. **compósitus** Britton. Umbel compound; *spikelets* 0.5–1.3 cm. long, *in dense cylindric heads.* — Local, Mass. to Fla., La., and Ia.

23. **C. refráctus** Engelm. *Culm smooth*, 3–9 dm. high; leaves soft and flat, 4–8 mm. broad, slightly scabrous; *rays* usually more or less elongated, *smooth; spikelets* very slender, acuminate, *subterete, in rather loose heads, divaricate or* more or less *reflexed*, 2–6-*flowered*, 1–3 *cm. long;* scales appressed, several-nerved, the lower empty and often persistent after the fall of the rest; joints of the rhachilla winged, inclosing the linear achene. — Dry woods and banks, N. J. to Ga. and Mo. Fig. 223.

223. C. refractus.

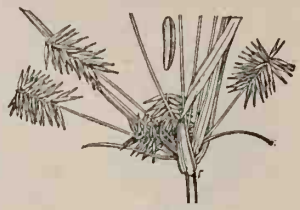
24. **C. lancastriénsis** Porter. Culm stoutish, triangular, smooth, 3–8 dm. high; *leaves rather broad* (0.5–1 cm.); umbel of 6–9 mostly elongated rays: *spikelets very numerous in*



224. C. lancastriensis.

short-cylindric or obovoid close heads, soon reflexed, 0.8–1.5 cm. long, of 3–6 narrow scales, the upper and lower empty, nearly twice the length of the linear-oblong achene. — Rich soil, N. J. and Pa. to Ga. Fig. 224.

25. **C. hystricìnus** Fernald. Slender; the *smooth rigid culm* 2–5 dm. high, much exceeding the *stiff narrow* (2–5 *mm. broad*) *smooth leaves;* umbel of 3–10 simple *smooth rays*, mostly shorter than the involucre; *spikelets* 1–2-*flowered*, *subulate*, rigid, 3–7 *mm. long*, densely crowded in *cylindric or narrowly obovoid heads* (1–2.5 cm. long), strongly reflexed, golden-brown at maturity; scales closely appressed, the fertile strongly nerved, the terminal involute-subulate; *achene* linear, 2–2.5 *mm. long*. — Dry sand, N. J. to Ga. Fig. 225.



225. C. hystricinus.

26. **C. dipsacifórmis** Fernald. *Culm scabrous*, at least above, 2.5–8 dm. high; *leaves* shorter than the culm, *scabrous-hispid above*, 4–9 *mm. wide;* umbel 4–12-rayed, some of the smooth rays equaling the involucre; *spikelets* 1–3-flowered, subulate, rigid, 6–11 *mm. long*, crowded *in cylindric or subcylindric heads* (1.5–4 cm. long), strongly deflexed, yellow-brown at maturity; fertile scales with green midribs; *achene* 3 *mm. long*. — Sandy barrens and dry woods, N. J. to Ky. and Ga. Fig. 226.

226. C. dipsaciformis.

27. **C. retrofráctus** (L.) Torr. *Culm* (0.3–1 m. high) minutely downy and *rough on the* obtusish *angles; leaves hairy*, short and stiff, 0.4–1 cm. wide, the margins becoming revolute; *umbel with* 4–12 upright usually *scabrous rays* mostly longer than the involucre; *spikelets slender-awl-shaped*, very numerous in *turbinate-obovoid* greenish or drab *heads* (1–2.5 cm. long), *soon strongly reflexed*, 1–2-*flowered* in the middle (5–8 mm. long); scales usually 4 or 5, the two lowest ovate and empty, the fertile lanceolate and pointed, the uppermost involute-awl-shaped; achene linear, 2.5–3 mm. long. — Sandy or rocky soil, N. J. to Fla. and Tex.; northw. in the low country to Mo. Fig. 227.

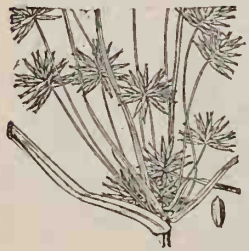
227. C. retrofractus.

228. C. ovularis.

28. **C. ovulàris** (Michx.) Torr. Culm smooth, sharply triangular (2.5–7 dm. high); umbel 1–6-rayed; *spikelets* (50–100) *in a globular head*, 3-*flowered*, *oblong*, *blunt* (3–5 mm. long); scales ovate, obtuse, a little longer than the linear-oblong achene. — Sandy dry soil, s. N. Y. to Ill., Kan., and southw.; rarely on ballast, Mass. Fig. 228. Var. robústus Boeckl. is a form with large heads, the spikelets 3–4-flowered (7–10 mm. long). — Ill. to Ark., and southw.

229. C. cylindricus.

29. **C. cylíndricus** (Ell.) Britton. Similar to the last, but the *heads short-cylindrical; spikelets usually* 2-*flowered*. (*C. Torreyi* Britton.) — L. I. to Fla., w. to Tex. Fig. 229.



230. C. echinatus.

30. **C. echinàtus** (Ell.) Wood. Culm smooth

231. C. flavus.

(1.5–6 dm. high), much exceeding the smooth (or scabrous-margined) flat (2–5 mm. wide) leaves; umbel with numerous ascending rays, the longest half as long as the involucre; *heads globose*, 1–1.5 cm. in diameter; *spikelets* 20–40, greenish, *rather loosely spreading*, lance-cylindric, *slightly compressed*, of 5–8 *membranous veiny ovate-lanceolate scales* (the 2 lowest and the subulate terminal one empty); achene oblong, 1.5–2 mm. long. — Rich sandy soil, Va. and Mo., southw. Fig. 230.

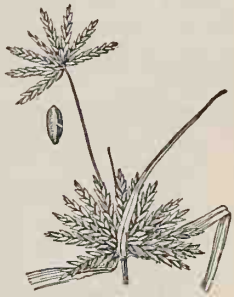
31. C. flàvus (Vahl) Boeckl. Culms sharply angled, smooth and wiry (2–5 dm. high), much exceeding the smooth flat leaves; *heads* 3–6, cylindric (1–1.7 cm. long), *sessile in a glomerule;* involucral bracts divergent or reflexed; spikelets crowded, 2.5–5 mm. long, dull, pale brown; *scales thin and veiny, the lowest often persistent.* — Waste ground, about Philadelphia. (Adv. from the Tropics.) Fig. 231.

232. C. Grayii.

32. C. Gràyii Torr. Culm thread-form, wiry (0.5–3 dm. high); *leaves almost bristle-shaped*, channeled; *umbel simple*, 4–10-*rayed; spikelets in a loose head, spreading; joints of the axis winged; scales rather obtuse*, greenish-chestnut-color, barely exceeding the oblong or *narrowly obovoid achene.* — Barren sands, Mass. to N. J., near the coast. Fig. 232.

233. C. Houghtonii.

33. C. Houghtònii Torr. Culms obtusely angled (2–7 dm. high), much exceeding the smooth narrow leaves; umbel subsessile or with a few elongate upright rays, mostly shorter than the involucre; spikelets linear-oblong, in loose heads, spreading-ascending; *scales roundish*, strongly nerved, *mucronate*, yellow-brown, barely exceeding the *broad-obovoid achene.* — Sandy soil, w. N. E. to Man. and Ore., locally s. to Va., Kan., and Ariz. Fig. 233.


234. C. filiculmis.

34. C. filicúlmis Vahl. Culm slender, wiry, often reclined (1.5–6 dm. high); *leaves linear* or filiform; *spikelets numerous and clustered in one sessile dense head, or in* 1–7 *additional looser heads on spreading rays* of an irregular umbel, those of the principal glomerules 8–12-flowered (1–1.6 cm. long); joints of the axis naked or winged; *scales blunt*, or the upper mucronate, thin, yellowish-green; achene 2 mm. long. (*C. Bushii* Britton.) — Dry sterile soil, Mass. to Ia., and southw.; rare northw. Fig. 234.

235. C. fil., v. macil.

Var. maciléntus Fernald. Usually low; spikelets 4–8-flowered (3–8 mm. long); scales firm, greenish; achenes shorter. — Me. to Ont., s. to Va., O., and Ill. Fig. 235.

2. KYLLÍNGA Rottb.

Spikelets of 3 or 4 two-ranked scales, 1–1½-flowered; the 2 lower scales minute and empty; style 2-cleft and achene lenticular; spikes densely aggregated in solitary or triple sessile heads. — Culms leafy at base; involucre 3-leaved. (Named after *Peder Kylling*, a Danish botanist of the 17th century.)

236. K. pumila.

1. K. pûmila Michx. Annual; culms 0.5–3 dm. high; head globular or 3-lobed, whitish-green, 4–8 mm. broad; spikelets

strictly 1-flowered; upper scales ovate, pointed, rough on the keel; stamens and styles 2; leaves linear. — Low grounds, Md. to O., Ill., and southw. Aug.–Oct. Fig. 236.

3. DULÍCHIUM Pers.

237. D. arundinaceum.

Spikelets linear, flattened, sessile in 2 ranks on peduncles emerging from the sheaths of the leaves; scales lanceolate, decurrent, forming flat wing-like margins on the joint below. Perianth of 6–9 downwardly barbed bristles. Stamens 3. Style 2-cleft above. Achene flattened, linear-oblong, beaked with the long persistent style. — A perennial herb, with a terete simple hollow culm (2–10 dm. high), jointed and leafy to the summit; leaves short and flat, linear, 3-ranked. (Name of uncertain origin.)

1. D. arundinàceum (L.) Britton. (*D. spathaceum* Pers.) — Wet swamps and borders of ponds, Nfd. to Wash., and southw. July–Oct. Fig. 237.

4. ELEÓCHARIS R. Br. Spike Rush

Spikelet few–many-flowered. Scales imbricated in many (rarely in 2 or 3) ranks. Perianth of 3–12 (commonly 6) bristles, usually rough or barbed downward, rarely obsolete. Style 2–3-cleft, its bulbous base persistent as a tubercle jointed upon the apex of the lenticular or triangular achene. — Leafless (rarely with basal capillary leaves), chiefly perennial, with tufted culms sheathed at the base, from matted or creeping rootstocks; flowering in summer. (Name from ἕλος, *a marsh*, and χάρις, *grace;* being marsh plants.)

a. Spikelet hardly if at all thicker than the spongy-cellular culm; scales firmly persistent.
  Spikelet cylindric, many-flowered; scales coriaceous, faintly nerved or nerveless.
    Culm terete . . . . . 1. *E. interstincta.*
    Culm sharply 4-angled . . . . . 2. *E. quadrangulata.*
  Spikelet linear- or lance-awl-shaped, few-flowered; scales herbaceous, distinctly nerved . . . . . 3. *E. Robbinsii.*
a. Spikelet much thicker than the culm (or, if slender, with deciduous scales) *b*.
  b. Achenes lenticular or biconvex; styles mostly 2-cleft *c*.
    c. Upper sheaths loose, with white scarious tips.
      Scales white, with green midribs . . . . . 4. *E. ochreata.*
      Scales purple-brown, with green midribs . . . . . 5. *E. olivacea.*
    c. Upper sheaths close and firm, green, not scarious, the tips often dark-margined *d*.
      d. Plants tufted, mostly annual, without conspicuous rootstocks *e*.
        e. Mature achenes black; tubercle saucer-shaped; upper sheath oblique at tip, the elongate tooth narrow-deltoid.
          Spikelet 1.5–2 mm. thick; achene 0.5 mm. long . . . 6. *E. atropurpurea.*
          Spikelet 2.5–3 mm. thick; achene 1 mm. long.
            Scales whitish-brown, with greenish rib; achenes jet black . . . . . 7. *E. capitata.*
            Scales purple-brown; achenes purple-black . . (7) *E. capitata*, v. *dispar.*
        e. Mature achenes whitish to pale brown; tubercle conic or deltoid; upper sheath with nearly truncate tip, the short tooth broad-deltoid *f*.
          f. Tubercle less than two-thirds as broad as the achene.
            Tubercle depressed turban-shape, broader than high; bristles wanting or rudimentary . . . . . 8. *E. diandra.*
            Tubercle deltoid-conic, higher than broad; bristles much exceeding the achene . . . . . 9. *E. ovata.*
          f. Tubercle nearly or quite as broad as the achene.
            Tubercle depressed-conic, concaved toward the tip, one-third as high as the achene; bristles much exceeding the achene . . . . . 10. *E. obtusa.*
            Tubercle flat-deltoid, with straight sides, one-fourth as high as the achene; bristles scarcely or not at all exceeding the achene.
              Bristles about equaling the achene . . . 11. *E. Engelmanni.*
              Bristles rudimentary or wanting . . (11) *E. Engelmanni*, v. *detonsa.*
      d. Plants not tufted, perennial from elongate rootstocks . . 12. *E. palustris.*

b. Achenes triangular or turgid; style 3-cleft *g.*
g. Achenes regularly reticulate or cross-lined.
Spikelets flattened, 3–9-flowered; the thin scales 2–3-ranked . 13. *E. acicularis.*
Spikelets terete; the scales many-ranked.
Upper sheaths loose, with white scarious tips; achenes finely cross-lined between the strong ribs . . . . 14. *E. Wolfii.*
Upper sheaths close and firm, not scarious; achenes distinctly reticulate.
Tubercle conic-subulate, much smaller than the achene . 15. *E. tortilis.*
Tubercle cap-shaped, as large as the achene . . . 16. *E. tuberculosa.*
g. Achenes smooth or papillose, not regularly reticulate *h.*
h. Tubercle depressed, as broad as high or broader.
i. Achenes white . . . . . 17. *E. Torreyana.*
i. Achenes yellow, brown, or black *j.*
j. Achenes smooth.
Tubercle flattened and closely covering the top of the black achene . . . . . 18. *E. melanocarpa.*
Tubercle short-conic, constricted below, narrower than the olive-brown achene . . . . . 19. *E. albida.*
j. Achenes papillose-roughened.
Achene with prominent keel-like angles . . . . 20. *E. tricostata.*
Achene with the angles not keeled.
Tips of the upper sheaths dark-girdled; achenes golden-yellow or orange-brown (in age drab), conspicuously papillose-roughened, plump, with rounded angles.
Culms filiform, 4-angled . . . . . 21. *E. tenuis.*
Culms flattened . . . . . 22. *E. acuminata.*
Tips of the upper sheaths whitish; achenes whitish-yellow, minutely roughened, with distinct angles 23. *E. nitida.*
h. Tubercle long-conic, higher than broad.
Tubercle clearly distinct from the achene.
Tubercle conic-subulate, much narrower than the plump achene.
Bristles exceeding the achene . . . . . 24. *E. intermedia.*
Bristles wanting . . . . . (24) *E. intermedia*, v. *Habereri.*
Tubercle conic-deltoid, nearly as broad as the compressed achene . . . . . 25. *E. Macounii.*
Tubercle seemingly confluent with the achene . . . 26. *E. rostellata.*

1. E. interstincta (Vahl.) R. & S. *Culms* large and stout (0.5–1 m. high), *knotted as if jointed by many cross-partitions; basal sheaths often leaf-bearing;* spikelets 2–4 cm. long; scales in several ranks, pale, with scarious margins; *achene with transversely linear-rectangular reticulation* and a conical-beaked tubercle; bristles 6, rigid, or wanting. (*E. equisetoides* Torr.) — Shallow water, Mass. to Fla., w. to Mich. and Tex. (W. I., S. A.) Fig. 238.

238. E. interstincta.

239. E. quadrangulata.

2. E. quadrangulàta (Michx.) R. & S. Similar; *culm continuous and sharply 4-angled;* spikelet 2–6 cm. long; *achene finely reticulated,* with a conical flattened distinct tubercle. (*E. mutata* Britton, not R. & S.) — Shallow water, Ct. to Mich., and southw., rare. Fig. 239.

3. E. Robbínsii Oakes. *Flower-bearing culms exactly triangular,* rather slender, erect (2–7 dm. high), also producing tufts of capillary abortive stems or fine leaves, which float in the water; sheath obliquely truncate; spikelet 1–2.5 mm. long; *scales only 3–9, few-ranked, convolute-clasping the long flattened joints of the axis, lanceolate, with thin scarious margins;* achene oblong-obovate, triangular, minutely reticulated, about half the length of the bristles, tipped with a flattened awl-shaped tubercle. — Shallow water, N. B. to Fla., w. to Mich. and Ind. Fig. 240.

240. E. Robbinsii.

241. E. ochreata. Spikelet × 2⅔. Achene × 10.

4. E. ochreàta (Nees) Steud. Similar in habit to the next; the *capillary culms* 3–30 cm. high; spikelets 2–6 mm. long; *scales*

very pale and thin, 1.5–2.5 mm. long; achene often equaling the bristles, tipped by a short slender conical tubercle. — Wet places, Va. to Fla. (W. I., S. A.) Fig. 241.

242. E. olivacea. Spikelet × 2⅔. Achene × 10.

5. **E. olivàcea** Torr. *Culms flattish*, grooved, diffusely tufted on usually slender matted rootstocks, 2–15 cm. high; *spikelet oblong-ovoid, acutish*, 20–30-*flowered*, 3–7 mm. long; *scales ovate, obtuse*, rather loosely imbricated, 2–3 mm. long, with a slightly scarious margin; achene obovoid, dull, green to blackish, 1 mm. long, shorter than the 6–8 *bristles;* tubercle capping ¼ of the summit of the achene, saucer-shaped, tipped by a long conic-subulate beak. — Wet shores, Me. to Ont., s. to N. C., Pa., O., and Mich. Fig. 242.

243. E. atropurpurea. Spikelet × 2⅔. Achene × 10.

6. **E. atropurpùrea** (Retz.) Kunth. Dwarf tufted annual; culms capillary, arcuate, 3–7 cm. long; *spikelet* oblong-ovoid, 2–4 *mm. long; scales* ovate, *thin-membranaceous*, blunt, *dark brown*, with pale midrib and margin; achene lenticular-obovoid, lustrous, black, with a minute saucer-shaped tubercle; bristles white, shorter than the achene. — Wet saud, "Ia." to Col., and southw. (Eurasia, W. I.) Fig. 243

244. E. capitata. Spikelet × 2⅔. Achene × 10.

7. **E. capitàta** (L.) R. Br. Culms terete, 0.3–3 dm. high; *spikelets ovoid to cylindric* (3–5 mm. long), obtuse, 15–40-flowered; *scales thickish*, round-ovate, *obtuse, pale brown*, with green keel and paler margins; stamens 2; achene obovoid, *black, about equaling the* 6–8 *bristles*, tipped with a flattened or saucer-shaped tubercle. — In sand or gravel near sloughs, Md. to Fla. and Tex. (W. I., S. A.) Fig. 244.

Var. díspar (E. J. Hill) Fernald. Scales purple-brown; achenes purple-black. (*E. dispar* E. J. Hill.) — Wet sand, Lake Co., Ind.

245. E. diandra. Spikelet × 2⅔. Achene × 10.

8. **E. diándra** C. Wright. Erect or depressed; culms 0.1–5 dm. long; spikelet ovoid, obtuse or acutish, 2–7 mm. long, 2–3.5 mm. thick; *scales* barely appressed, ovate to ovate-oblong, blunt, dull, *pale brown*, with prominent green midrib; achene obovoid or inverted-pyriform, 1 mm. long. — Sandy shores of the Androscoggin, Merrimac and Connecticut Rivers, and of Oneida L. (N. Y.) — Differing constantly from the next in its depressed tubercle and paler scales, as well as in the absence of bristles. Fig. 245.

246. E. ovata. Spikelet × 2⅔. Achene × 10.

9. **E. ovàta** (Roth) R. & S. Erect or depressed; culms 0.3–5 dm. long; spikelet globose-ovoid to ovoid-cylindric, obtuse, densely flowered, 2–7 mm. long, 2–4 mm. thick; *scales* oblong to narrowly ovate, obtuse, *purple-brown*, with pale midrib and white scarious margin; achene obovoid or inverted-pyriform, about 1 mm. long. — Wet places, N. B. to Ct. and Mich.; Ore. (Eurasia.) Fig. 246.

247. E. obtusa. Spikelet × 2⅔. Achene × 10.

10. **E. obtùsa** (Willd.) Schultes. Similar; culms 0.5–7 dm. high; *spikelet globose-ovoid to ovoid-oblong, obtuse*, 2–13 mm. long, 2–5 mm. thick; *scales* ovate-oblong to suborbicular, with rounded tips, *densely crowded in many ranks, dull brown; style* 3(rarely 2)-*cleft; achene* turbinate-obovoid with narrow base, pale brownish, shining, shorter than the 6–8 bristles, *slightly broader than the short-deltoid acute and flattened tubercle.* (*E. ovata* Man. ed. 6.) — Muddy places, N. S. to Ont., and southw.; B. C. and Wash. Fig. 247. — Like all the annual species, very variable in size and habit.

11. **E. Engelmánni** Steud. Similar; culms 1.5–3 dm.

high; *spikelet cylindric*, 5–20 mm. long, 2–4 mm. thick, acutish; scales close-appressed, brown; *achenes with broad much flattened tubercle; bristles about equaling the achene.* — Local, Mass. to Mo. Fig. 248. Var. DETÓNSA Gray. *Bristles wanting or rudimentary.* — More frequent, Mass. to Neb., s. to Pa., Ind., and Ariz.

248. E. Engelmanni. Spikelet × 2⅔. Achene × 10.

12. E. palústris (L.) R. & S. Culms nearly terete, striate, 0.1–1.5 m. high; *spikelet slender, sub-cylindric, pointed, many-flowered; scales ovate-oblong*, loosely imbricated, reddish-brown with a broad and translucent whitish margin and a greenish keel, the upper acutish, the lowest rounded and often enlarged; achene obovoid, somewhat shining, crowned with a short ovate or ovate-triangular flattened tubercle, shorter than the *usually* 4 *bristles.* — Very common and variable, either in water, where it is rather stout and tall, or in wet grassy grounds, where it is slender and lower. (Eurasia.) Fig. 249. Var. GLAUCÉSCENS (Willd.) Gray. Culms slender or filiform; tubercle narrower, acute, beak-like, sometimes half as long as the achene. — With the type. Var. CÁLVA (Torr.) Gray. Bristles none; tubercle short, but narrower than in the type. — Local. Var. VÌGENS Bailey. Culms very stout, rigid; achene more broadly obovoid. — Lake margins, northw.

249. E. palustris. Spikelet × 2. Achene × 10.

13. E. aciculàris (L.) R. & S. Culms finely capillary, 3–10 dm. high (becoming much elongate when submersed), *more or less 4-angular;* spikelet 2–6 mm. long; scales ovate-oblong, rather obtuse (greenish with purple sides); achenes obovate-oblong, only the lowest maturing, *with 3-ribbed angles and 2–3 times as many smaller intermediate ribs*, also transversely striate, longer than the 3–4 very fugacious bristles; *tubercle conical-triangular.* — Muddy shores, across the continent. (W. I., Eurasia.) Fig. 250.

250. E. acicularis. Spikelet × 2. Achene × 10.

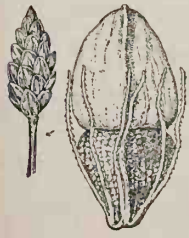
251. E. Wolfii. Spikelet × 2. Achene × 10.

14. E. Wólfii Gray. *Culms* slender (2–3 dm. high), from very small creeping rhizomes, *2-edged;* spikelet slender-ovoid, acute, 0.5–1 cm. long; scales ovate-oblong, obtuse, scarious, pale purple; achene pyriform, shining, *with 9 nearly equidistant obtuse ribs having transverse wrinkles between them; tubercle depressed, truncate*, more or less apiculate; bristles none. — Wet prairies, Ill., Minn., and Ia. Fig. 251.

15. E. tórtilis (Link) Schultes. *Culms* tufted from fibrous roots, *sharply triangular, capillary*, twisting when dry; spikelet turgid-ovoid, 3–6 mm. long, few-flowered; scales firm-membranaceous, persistent, ovate; bristles stout, barbed, as long as the striate and pitted-reticulate achene and its *conic-beaked tubercle.* — N. J. to Fla. Fig. 252.

252. E. tortilis. Spikelet × 2. Achene × 10.

16. E. tuberculòsa (Michx.) R. & S. Similar; *culms flattish*, striate; spikelet 5–13 mm. long, many-flowered; *tubercle flattish-cap-shaped.* — Wet sandy soil, from Mass. along the coast to Fla. Fig. 253.



253. E. tuberculosa. Spikelet × 2. Achene × 10.

17. E. Torreyàna Boeckl. Tufted culms capillary, 1–6 dm. high; *spikelet small* (2–5 *mm. long*), *sometimes proliferous*, the one or more short new culms from the axil of its lowest scale, which persists as an herbaceous bract; *scales thin, ovate, acutish, whitish-green and brown; achene tiny, white, with sharp angles* and a *short*

254. E. Torreyana. Spikelet × 2. Achene × 10.

conical tubercle, which is hardly equaled by the 3–6 slender bristles. — Wet pine-barrens, etc., Ct. to Fla. Fig. 254.

18. **E. melanocárpa** Torr. Tufted, from a *short thick caudex; culms flattened*, grooved, wiry, erect (2.5–7 dm. high), the close *basal sheaths with truncate mucronate tips; spikelet cylindrical-ovoid, thick*, obtuse, densely many-flowered (7–15 *mm. long*); *scales* closely many-ranked, roundish-ovate, very obtuse, *brownish*, with *broad scarious margins; achene glossy, obovoid-top-shaped, obtusely triangular, the broad summit entirely covered by the flat depressed tubercle*, which is raised in the center into a short abrupt triangular point; bristles often obsolete; achene soon blackish. — Wet sand, Mass. to Fla.; also n. Ind., where the culms are sometimes proliferous at tip (*Hill*). (Bermuda.) Fig. 255.

255. E. melanocarpa. Spikelet × 2. Achene × 10.

19. **E. álbida** Torr. Tufted, *from a slender creeping base;* culms slender, wiry, striate, 1–4 dm. high, the *basal sheaths with very oblique tips;* spikelet cylindric-ovoid, blunt, 4–9 mm. long; *scales* obtuse, *whitish to light brown, with narrow scarious margin; achenes* smooth, *not glossy*, trigonous-pyriform, 1 mm. long, *contracted below the conic-deltoid pale tubercle*, and usually *exceeded by the reddish bristles.* — Damp chiefly brackish soil, Md. to Fla., etc. (Mex., W. I.) Fig. 256.

256. E. albida. Spikelet × 2. Achene × 10.

20. **E. tricostàta** Torr. Rootstock stout and tough; *culms flattish* (2–6 dm. high); *spikelet soon cylindrical*, densely many-flowered (6–18 mm. long); scales ovate, very obtuse, rusty brown, with broad scarious margins; *achene obovoid, with 3 prominent angles, minutely rough-wrinkled, crowned with a short-conical acute tubercle;* bristles none. — N. Y. to Fla. Fig. 257.

257. E. tricostata. Spikelet × 2. Achene × 10.

21. **E. ténuis** (Willd.) Schultes. *Culms almost capillary, erect* from running rootstocks, 4-*angular* (0.5–7 dm. high), the sides concave; *spikelet ellipsoidal, acutish*, 20–30-*flowered* (3–10 mm. long); *scales ovate, obtuse*, chestnut-purple, with a broad scarious margin and green keel, the outer 2 or 3 *mm. long; achene* plump, *obovoid, roughish-wrinkled*, 1–1.3 mm. long, *crowned with a small depressed tubercle*, persistent after the fall of the scales; bristles ½ as long as the achene or none. — Nfd. to Man., and southw. June–Aug. Fig. 258.

258. E. tenuis. Spikelet × 2. Achene × 10. Cross-section of culm × 5.

22. **E. acuminàta** (Muhl.) Nees. Similar; rootstock generally stouter and stiffer; *culms flat*, striate, tufted, usually coarser; *scales lance-ovate, the uppermost acute.* (*E. compressa* Sulliv.) — Wet places, oftenest in calcareous soil, N. Y. and Ont., southw. Fig. 259. — Perhaps a variety of the last.

259. E. acuminata. Spikelet × 2. Achene × 10. Cross-section of culm × 5.

23. **E. nítida** Fernald. Perennial, from slender rootstock; culms capillary, 4-angled, striate, 2–8 cm. high; spikelet ovoid, acutish, 2.5–4.5 mm. long, 1.5–2.5 mm. thick, 8–20-flowered; *scales elliptic-oblong*, with rounded tips, purplish-brown, with greenish ribs and very narrow scarious margins, *the lowermost* 1–1.2 *mm. long; achenes whitish-straw-color*, narrowly obovoid, *sharply trigonous*, very minutely (under a lens) roughened, 0.7–1 mm. long, the very narrow crown-like tubercle with a short point in the middle. — Springy spots, valley of the Ottawa R., Can. (*J. Macoun*). Early June. Fig. 260.

260. E. nitida. Spikelet × 2. Achene × 10.

24. **E. intermèdia** (Muhl.) Schultes. *Culms capillary*, striate-grooved, densely tufted from fibrous roots, *diffusely spreading or reclining* (0.2–4 dm

long); sheaths with oblique tips; *spikelet cylindric-ovoid, acutish, loosely* 5–20-*flowered* (2–7 mm. long); scales oblong, obtuse, green-keeled, the sides purplish-brown; achene obovoid with a narrowed base, beaked with a slender conical-awl-shaped tubercle, which nearly equals the 6 bristles. — Wet places, Gaspé Co., Que., to w. Ont., s. to n. Me., w. Ct., N. J., Pa., O., and Ia. Fig. 261. Var. Haberèri Fernald. Bristles absent or rudimentary. — Shores of Oneida L., N. Y. (*J. V. Haberer*).

261. E. intermedia. Spikelet × 2. Achene × 10.

262. E. Macounii. Spikelet × 2. Achene × 10.

25. **E. Macoúnii** Fernald. Annual; culms weak, 2 or 2.5 dm. long; spikelet lance-ellipsoid, 1 cm. long, densely flowered; *scales* ovate-lanceolate, acutish or blunt, *dark brown; achene much compressed, trigonous-obovoid*, twice as long as the broad deltoid-conical tubercle. — Border of marsh, North Wakefield, Que. (*J. M. Macoun*). Fig. 262.

26. **E. rostellàta** Torr. *Perennial, from short thick caudex; culms flattened and striate-grooved*, wiry, erect (3–12 dm. long), *the sterile ones reclining, rooting and proliferous* from the apex, the sheath transversely truncate; *spikelet spindle-shaped*, 12–20-flowered, 6–15 mm. long; scales ovate, obtuse (light brown); achene obovoid-triangular, narrowed into the confluent pyramidal tubercle, which is overtopped by the 4–6 bristles. — Salt marshes, N. H. to Fla., and locally in alkaline situations inland. (Mex., Cuba.) Fig. 263.

263. E. rostellata. Spikelet × 2. Achene × 10.

5. DICHRÓMENA Michx.

Spikelets few-flowered, all but 3 or 4 of the flowers usually imperfect or abortive. Scales imbricated somewhat in 2 ranks, more or less conduplicate or boat-shaped, keeled, white or whitish. Stamens 3. Style 2-cleft. Perianth, bristles, etc., none. Achene lenticular, wrinkled transversely, crowned with the persistent and broad tubercled base of the style. — Culms leafy, from creeping perennial rootstocks; the leaves of the involucre mostly white at the base (whence the name, from δίς, *double*, and χρῶμα, *color*).

264. D. colorata.

1. **D. coloràta** (L.) Hitchc. *Culm triangular* (0.25–1 m. high); leaves narrow; *those of the involucre* 4–7, *linear;* achene truncate, not margined. (*D. leucocephala* Michx.) — Damp pine-barrens, N. J. to Fla. and Tex.; very rare northw. July–Sept. (Mex., W. I.) Fig. 264.

2. **D. latifòlia** Baldw. *Culm* stouter, *nearly terete;* leaves broadly linear; *those of the involucre linear-lanceolate*, 8 *or* 9, *tapering from base to apex;* achene round-obovoid, faintly wrinkled, the tubercle decurrent on its edges. — Low pine-barrens, Va. to Fla. and Tex. Fig. 265.

265. D. latifolia.

6. PSILOCARYA Torr. Bald Rush

Spikelets ovoid, terete, the numerous scales all alike and regularly imbricated, each with a perfect flower. Stamens mostly 2. Style 2-cleft, its base enlarging and hardening to form the beak of the lenticular or tumid more or less wrinkled achene. — Annuals, with leafy culms, the spikelets in terminal and axillary cymes. (Name from ψιλός, *naked*, and κάρυον, *nut*.)

266. P. scirpoides.

1. **P. scirpoides** Torr. Annual (0.2–3 dm. high), leafy; leaves flat; spikelets 20–30-flowered; scales oblong-ovate, acute, chestnut-colored; *achene finely roughened*, somewhat margined, *beaked with a long sword-shaped almost wholly persistent style.* — Wet sandy shores and swamps, Mass. and R. I.; n. Ind. Aug.–Oct. Fig. 266.

2. **P. nitens** (Vahl) Wood. Similar; often becoming 5–7 dm. high; *faces of the achene with strong transverse ribs; tubercle depressed, broader than high.* — Wet sandy shores and bogs, L. I. and Del., southw.; n. Ind. Aug.–Oct. Fig. 267.

267. P. nitens.

7. STENOPHÝLLUS Raf.

Spikelets as in *Fimbristylis*, the comparatively large scales in few ranks. Stamens 2 or 3. Style 2–3-cleft, filiform, glabrous, its base swollen and forming a persistent colored tubercle. Otherwise as in *Fimbristylis;* standing in the same relation to that genus as *Eleocharis* to *Scirpus.* — Leaves primarily basal, narrowly linear or filiform, the sheaths hairy or ciliate. (Name from στενός, *narrow*, and φύλλον, *leaf.*)

268. S. capillaris.

1. **S. capillàris** (L.) Britton. Low annual, densely tufted (0.3–3 dm. high); culms and leaves nearly capillary, the latter short, minutely ciliate; umbels compound or panicled, loose or compact (in dwarf plant often much reduced); spikelets ovoid-oblong, brown to blackish; stamens 2; achene acutely triangular, minutely wrinkled, very blunt. (*Fimbristylis* Gray.) — Sandy fields, Me. to Fla., w. to the Pacific. July–Oct. (Trop. Am.) Fig. 268.

8. FIMBRÍSTYLIS Vahl.

Spikelets several–many-flowered, terete; scales all floriferous, regularly imbricated in several ranks. Stamens 1–3. Style 2–3-cleft, often with a dilated or tumid base, which is deciduous from the apex of the naked lenticular or triangular achene. Otherwise as in *Scirpus.* Spikelets in our species umbelled, and the involucre 2–3-leaved. (Name compounded of *fimbria*, a fringe, and *stylus*, style, which is fringed with hairs in the genuine species.)

269. F. spadicea.

* *Style 2-cleft; achene lenticular.*

← *Spikelets mostly on elongate rays; style ciliate.*

1. **F. spadicea** (L.) Vahl. *Perennial, rigid; the thickened base covered with firm dark sheaths;* culms wiry, 0.3–1 m. high, nearly naked; *leaves* pale and firm, *involute;* umbel 3–10-rayed, the rays very unequal, some simple, others forking; *spikelets ovoid to short-cylindric*, 0.7–1.7 *cm. long, the firm somewhat lustrous dark scales all glabrous; stamens* 2 *or* 3; achene broadly obovate, lustrous, minutely striate and reticulated. — Sand-dunes and brackish shores, Va. to Fla. and Tex. Aug.–Oct. (Trop. Am.) Fig. 269.

270. F. castanea.

2. **F. castànea** (Michx.) Vahl. Similar; more slender (1.5–7 dm. high) and *freely stoloniferous; the basal sheaths softer and thinner;* the culms and the *thread-form or convolute-channeled leaves smooth* and somewhat rigid; *spikelets ovoid-ellipsoid* 0.5–1 *cm. long*, becoming cylindrical, chestnut-color; *the scales softer and thinner, at least the lower puberulent.* (*F. spadicea*, var. Gray.) — Salt marshes and sand, along the coast from N. Y. to Fla. and Tex.; extending northw. in the interior to Ont., Mich., Ill., and Neb. July–Oct. Fig. 270.

Var. **pubérula** (Michx.) Britton. *Leaves and scapes pubescent.* — Ga. and Fla. to Tex.; also n. in the flat country to Ind., Ill., and Mo.

3. **F. láxa** Vahl. *Culms* slender (0.5–7 dm. high) from an *annual root, weak*, grooved and flattish; *leaves linear, flat, ciliate-denticulate, glaucous*, sometimes hairy; spikelets ovoid, acute (0.4–1 cm. long); *stamen* 1; *achene conspicuously* 6–8-*ribbed on each side, and with finer cross-lines.* — Low ground, near the coast, Pa. to Fla. and Tex.; n. in the flat country to Ill. and Mo. July–Oct. (Trop. Am.) Fig. 271.

271. F. laxa.

272. F. Vahlii.

+ + *Spikelets glomerulate; style glabrous.*

4. **F. Váhlii** (Lam.) Link. *Dwarf tufted annual* (0.3–2 dm. high); the culms, leaves and *very elongated upright bracts filiform;* glomerule 0.3–1 cm. in diameter; spikelets 3–8, subcylindric, greenish or pale brown, the narrow scales acuminate; *achene* minute, *transversely reticulate.* — Damp sands, etc., N. C. to Fla., Tex., and Mo.; introd. near Phila. July–Oct. Fig. 272.

* * *Style 3-cleft; achene triangular.*

5. **F. autumnàlis** (L.) R. & S. Annual (1–4 dm. high), in tufts; culms flat, slender, diffuse or erect; leaves flat, acute; *umbel compound or decompound*, the *very numerous slender-cylindric to fusiform* brown *spikelets* 4–10 mm. long; the mucronate-acuminate ovate-lanceolate *scales appressed;* stamens 1–3; *achenes very minute*, 0.5 *mm. long*, smooth or minutely roughened. — Low grounds, Pa., Ill., and Mo., southw. July–Sept. (Trop. Am.) Fig. 273.

273. F. autumnalis.

6. **F. Fránkii** Steud. Similar, 0.1–2 dm. high; the *umbel simple or slightly compound* (or the spikelets solitary in dwarf plants); *spikelets ellipsoid or narrowly ovoid*, castaneous, the slender *tips of the scales slightly spreading; achenes* 0.75 *mm. long.* (*F. autumnalis* Man. ed. 6, in part.) — Sandy shores, Me. to Ont., and southw. Aug.–Oct. Fig. 274.

274. F. Frankii.

9. SCÍRPUS [Tourn.] L. Bulrush or Club Rush

Spikelets few–many-flowered, solitary or in a terminal cluster when it is subtended by a 1–several-leaved involucre (this when simple often appearing like a continuation of the culm); the scales in several ranks, or rarely inclining to be 2-ranked. Flowers to all the scales, or to all but one or two of the lowest, all perfect. Perianth of 1–6 (or 8) bristles, or sometimes wanting. Stamens 2 or 3. Style 2–3-cleft, simple, wholly deciduous, or sometimes leaving a tip or point to the lenticular or triangular achene. — Culms sheathed at base. (The Latin name of the bulrush.)

a. Involucre none, or merely the modified outer caducous scale of the solitary terminal small (2.5–7 mm. long) spikelet; achene trigonous, smooth *b.*

b Perianth-bristles terete and setulose.

Scales of the flattened spikelet membranous and awnless; bristles retrorsely barbed; achenes beaked.

Achene 1 mm. long, constricted below the beak . . . . . 1. *S. nanus.*

Achene 2–2.5 mm. long, the pale beak continuous with the body 2. *S. pauciflorus.*

Scales of the terete spikelet with firm green midribs, that of the outermost prolonged into a blunt awn; bristles setulose with spreading or ascending fine hairs; achenes beakless.

Only the outermost scale awned . . . . . 3. *S. Clintonii.*
All the scales awned . . . . . 4. *S. planifolius.*
b. Perianth-bristles ligulate and barbless; scales chartaceous, the midrib of at least the outer prolonged into a rigid awn.
Culms terete and smooth at tip; achene 2 mm. long, slightly exceeded by the perianth . . . . . 5. *S. caespitosus.*
Culms trigonous and scabrous above; achene about 1 mm. long; the perianth becoming 2–3 cm. long . . . . . 6. *S. hudsonianus.*
a. Involucre foliaceous or appearing to be a continuation of the culm *c.*
c. Involucral bract 1 (occasionally with a secondary small involucel), appearing to be a continuation of the culm *d.*
d. Spikelet solitary; culms flaccid . . . . . 7. *S. subterminalis.*
d. Spikelets normally more than 1; culms firm *e.*
e. Spikelets crowded into a subterminal short spike . . . . . 8. *S. rufus.*
e. Spikelets distinct, paniculate or glomerulate *f.*
f. Spikelets sessile or in glomerules *g.*
g. Annuals with tufted roots; culms terete or obtusely angled.
Achenes transversely wrinkled . . . . . 9. *S. Hallii.*
Achenes smooth or merely pitted.
Achenes unequally biconvex or lenticular.
Bristles surpassing the achene . . . . . 10. *S. debilis.*
Bristles wanting . . . . . (10) *S. debilis*, v. *Williamsii.*
Achenes plano-convex, one face distinctly flattened.
Bristles wanting . . . . . 11. *S. Smithii.*
Bristles present . . . . . (11) *S. Smithii*, v. *setosus.*
g. Perennials with running rootstocks; culms sharply trigonous *h.*
h. Involucral leaf erect.
Involucral leaf 4–15 cm. long; spikelets pointed.
Scales reddish-brown, ciliate, awn-tipped; achene plano-convex, broadly obovoid, short-mucronate . . 12. *S. americanus.*
Scales yellowish-brown, entire, mucronate; achene trigonous, oblong-obovoid, long-mucronate . . 13. *S. Torreyi.*
Involucral leaf 1–3 cm. long; spikelets obtuse . . . 14. *S. Olneyi.*
h. Involucral leaf strongly divergent . . . . . 15. *S. mucronatus.*
f. Spikelets more or less loosely umbellulate or paniculate *i.*
i. Culms triangular, from a short rootstock; basal sheath bearing a long triangular leaf; involucral leaf keeled, much overtopping the loose umbel . . . . . 16. *S. etuberculatus.*
i. Culms and short involucral leaf terete, the latter shorter than the 1-sided compound umbel-like panicle of tawny spikelets; basal sheaths mostly bladeless *j.*
j. Achenes lenticular; bristles 4–6, subequal, about as long as the achenes.
Achenes 2 mm. long, nearly equaling the scales . . 17. *S. validus.*
Achenes 2.5–3 mm. long, much exceeded by the scales . 18. *S. occidentalis.*
j. Achenes trigonous; bristles very unequal, mostly shorter than the achenes . . . . . 19. *S. heterochaetus.*
c. Involucral bracts 2 or more, leaf-like; culms leafy *k.*
k. Spikelets large, 1–5 cm. long, 0.5–1 cm. thick; midrib of the scales extended beyond the somewhat lacerate or 2-cleft apex as an awn; culms sharply trigonous; rootstocks cord-like, with frequent tuber-like thickenings.
Achenes sharply and equally trigonous . . . . . 20. *S. fluviatilis.*
Achenes lenticular, plano-convex or obscurely trigonous.
Scales of the spikelets rufescent, bearing numerous elongate red markings . . . . . 21. *S. robustus.*
Scales whitish to castaneous, not rufescent.
Scales whitish-brown . . . . . 22. *S. campestris.*
Scales drab to castaneous.
Spikelets all or mostly in a dense glomerule . (22) *S. campestris*, v. *paludosus.*
Spikelets 1–several on mostly elongate rays.
Spikelets long-cylindric, 2–5 cm. long (22) *S. campestris*, v. *novae-angliae.*
Spikelets ovoid, 1–2 cm. long . . . . (22) *S. campestris*, v. *Fernaldi.*
k. Spikelets small, 2–15 mm. long, 1–3 mm. thick, very numerous, in decompound umbelliform panicles *l.*
l. Bristles retrorsely barbed; spikelets in glomerules; culms mostly solitary; the short caudex bearing thick scaly stolons *m.*
m. Lower sheaths (at least) red-tinged; bristles barbed nearly to base *n.*
n. Achenes lenticular; style-branches 2; bristles 4.
Primary and secondary rays of the inflorescence mostly elongate, the ultimate glomerules mostly peduncled . 23. *S. rubrotinctus.*
Primary and secondary rays abbreviated, most of the ultimate glomerules crowded in irregular masses (23) *S. rubrotinctus*, v. *confertus.*
n. Achenes trigonous; style-branches 3; bristles 3 or 6.
Spikelets narrowly ovoid, 3–5 mm. long . . . . 24. *S. sylvaticus.*
Spikelets cylindric, 6–14 mm. long . . . (24) *S. sylvaticus*, v. *Bissellii.*
m. Sheaths uniformly greenish, not red; bristles barbed only above the middle *o.*

o. Bristles sborter tban or ahout equaling tbe achene *p.*
p. Lower leaves and sheaths nodulose-reticulate; bristles nearly or quite equaling the achene.
Scales of the spikelet dark brown, orbicular-ovate, abruptly mucronate, 1.5–2 mm. long, one-third longer than the achenes.
Some of the rays of the inflorescence elongate and definite . . . . . 25. *S. atrovirens.*
All tbe rays abbreviated and hidden in the dense inflorescence . . . . . (25) *S. atrovirens*, v. *pycnocephalus*
Scales of the spikelet ligbt brown, elliptic-ovate, narrowed to a long setulose awn, about twice as long as tho acbenes . . . . . 26. *S. pallidus.*
p. Lower leaves and sheatbs smootb and hardly nodulose; bristles shorter than the achene or often wanting . . 27. *S. georgianus.*
o. Bristles twice as long as tbe achene.
Spikelets ovoid, 2.5–3.5 mm. long . . . . . 28. *S. polyphyllus.*
Spikelets cylindric, 5–8 mm. long . . (28) *S. polyphyllus*, v. *macrostachys*
l. Bristles smooth or with few scattered or ascending hairs (not regularly retrorse-barbed), bent or curled; non-stoloniferous plants in tufts or stools *q.*
q. Bristles at maturity scarcely exceeding the scales.
Bristles firm, appressed, sborter than or ahout equaling tbe achene . . . . . 29. *S. divaricatus.*
Bristles weak, loosely ascending, about twice as long as the achene.
Scales with the strong green midrib prolonged into a sharp point . . . . . 30. *S. lineatus.*
Scales hlunt, the midrib inconspicuous . . . . . 31. *S. Peckii.*
q. Bristles at maturity much exceeding the scales *r.*
r. Spikelets all in glomerules of 3 to 15.
Involucels reddish-hrown.
Spikelets ovoid, 3–6 mm. long . . . . . 32. *S. cyperinus.*
Spikelets cylindric, 7–10 mm. long . . (32) *S. cyperinus*, v. *Andrewsii.*
Involucels dull brown or drah, with hlackish bases.
Rays elongate, the glomerules mostly distinct . (32) *S. cyperinus*, v. *pelius.*
Rays ahbreviated, the glomerules crowded in dense irregular masses . . . . . (32) *S. cyperinus*, v. *condensatus.*
r. Lateral spikelets of eacb group mostly pediceled (pedicels short and obscure only in a variety with congested panicles) *s.*
s. Involucels hrown or reddish.
Involucels bright red-hrown or terra-cotta . . . . 33. *S. Eriophorum.*
Involucels dull brown, not reddish.
Spikelets 3–6 mm. long, pale brown to straw-color . 34. *S. pedicellatus.*
Spikelets 7–10 mm. long, drab . . . (34) *S. pedicellatus*, v. *pullus.*
s. Involucels black.
Rays mostly elongate, the raylets usually definite . . 35. *S. atrocinctus.*
Rays and raylets ahhreviated, the spikelets crowded in irregular masses . . . . . (35) *S. atrocinctus*, v. *brachypodus.*

1. **S. nànus** Spreng. Culms densely tufted, bristle-like, flattened and grooved (1–7 cm. high); spikelet ovoid, 3–8-flowered; scales ovate, the upper rather acute; bristles mostly longer than the ovoid achene, sometimes wanting. (*Eleocharis pygmaea* Torr.) — Brackish marshes of the Atlantic coast; locally inland in N. Y., Mich., and Minn. July–Sept. (Eu., n. Afr., Mex., Cuba.) Fig. 275.

275. S. nanus.

2. **S. pauciflòrus** Lightf. Culms striate-angled, very slender (0.5–4 dm. high), scarcely tufted, on slender running rootstocks, with a short truncate sheath at base; scales chestnut-brown, pointless, all flower-bearing, the two lower larger; bristles 3–6, about as long as the achene. (*Eleocharis* Link.) — Wet calcareous soil, Que. to B. C., s. to n. N. E., N. Y., Pa., Ill., etc. June–Sept. (Eurasia.) Fig. 276.

276. S. pauciflorus.

3. **S. Clintònii** Gray. *Culms acutely triangular*, almost bristle-like; sheaths at the base bearing a *very slender almost bristle-shaped leaf* shorter (usually very much shorter) than the culm; outer scale mostly shorter than the pale-chestnut ovoid spikelet; achene 1.5–2 mm. long, compressed, broadly obovoid, equaled or exceeded by the bristles. — Dry banks, N. B. and Me. to w. N. Y. and Mich.; "N. C." May, June. Fig. 277.

277. S. Clintonii

4. **S. planifòlius** Muhl. *Culms triangular, leafy* at base; *leaves linear, flat*

278. S. planifolius.

as long as the culm, and like it rough-edged; outer scale usually overtopping the ovoid or subcylindric straw-colored or brownish spikelet; bristles mostly about as long as the achene. — Dry open woods, Mass. and Vt. to Del., Pa., and Mo. May, June. Fig. 278.

5. **S. caespitòsus** L. *Culms terete*, wiry, 1–5 dm. high, densely sheathed at base, in compact turfy tufts; the upper sheath bearing a very *short awl-shaped leaf;* spikelet ovoid, rust-color; outer rigid-pointed scale scarcely surpassing the spikelet; *bristles smooth*, longer than the abruptly short-pointed achene. — Mts., cold shores and swamps, Lab. to Alaska, s. to N. S., n. N. E., N. Y., Ill., Minn., etc.; and on the summits of the s. Alleghenies. (Eurasia.) Fig. 279.

279. S. caespitosus

280. S. hudsonianus.

6. **S. hudsoniànus** (Michx.) Fernald. Culms slender, many in a row from a running rootstock (1.5–4 dm. high), scabrous, naked; sheaths at the base awl-tipped; scales brownish, oblong-lanceolate; *bristles white, crisped, many times exceeding the* narrowly obovoid apiculate *achene.* (*Eriophorum alpinum* L., not *S. alpinus* Schleich.) — Cold bogs and wet shores Nfd. to Hudson Bay and B. C., s. to Ct., N. Y., Mich., and Minn. May–Aug. (Eu.) Fig. 280.

7. **S. subterminàlis** Torr. *Aquatic*, rarely emersed; rootstock slender; culms (0.3–1 m. long, thickish-filiform) partly and the shorter filiform leaves wholly submersed, cellular; the filiform green bract 1–5 cm. long, surpassing the subcylindric to ovoid spikelet (6–13 mm. long); scales green or straw-color, somewhat pointed; *bristles bearded downward*, rather shorter than the abruptly pointed achene. — Slow streams and ponds, Nfd. to B. C., s. to N. J., Pa., Mich., n. Ind., etc. Fig. 281.

281. S. subterminalis

282. S. rufus.

8. **S. rûfus** (Huds.) Schrad. Freely stoloniferous; culms smooth, subterete, compressed, 1–6 cm. high, taller than the subterete channeled callous-tipped firm mostly basal leaves; *spike distichous*, 1–2 cm. long, *consisting of closely crowded 2–5-flowered spikelets;* involucre 1–5 cm. long, sometimes wanting; scales castaneous, conduplicate, pointed; bristles 0, or 3–6, upwardly barbellate, much shorter than the plano-convex ellipsoid long-beaked achene (4.5–5.5 mm. long). — Brackish marshes, e. N. B. and Que. July, Aug. (Eurasia.) Fig. 282.

9. **S. Hállii** Gray. *Culms* slender, *terete*, 1–4 dm. high; upper sheath rarely distinctly leaf-bearing; spikelets 1–7 in a sessile or sometimes geminately proliferous cluster, ovoid becoming cylindrical, acute, greenish (0.5–1.5 cm. long); scales ovate, strongly keeled, cuspidate-acuminate; stamens 2 or 3; style 2-cleft; *bristles none; achene obovate-orbicular*, mucronate, plano-convex, *strongly wrinkled transversely.* (*S. supinus*, var. Gray.) — Wet shores, Ill. to Fla. and Tex.; also Winter Pond, Winchester, Mass. Aug., Sept. Fig. 283.

283. S. Hallii.

10. **S. débilis** Pursh. *Culms obtusely triangular*, with somewhat hollowed sides, 1–6 dm. high, yellowish-green, shining; spikelets 1–12, capitate, ovoid, obtuse (0.5–1 cm. long); involucral leaf often horizontal at maturity; scales roundish, with tawny margins; stamens 3; style 2–3-cleft; *bristles* 6, *stout*, downwardly barbed, equaling or two surpassing the broadly obovoid *turgid* abruptly mucronate-pointed achene. — Sandy or muddy shores, Me. to Minn., and southw. Aug., Sept. Fig. 284. Var. Williámsii Fernald. Bristles wanting. — Massapoag L., Sharon, Mass.

284. S. debilis.

11. **S. Smíthii** Gray. *Culms terete*, slender, 0.5–4 dm. high, often leaf-bearing from the upper sheath, dull green as are the

1–5 ovoid acutish spikelets (0.5–1 cm. long); involucral leaf always erect; scales oblong-oval; style 2-cleft; *bristles* 1 *or* 2 *minute rudiments or none;* achene cuneate-obovate. — Wet shores, local, Me. to Pa., Ill., Mich., and Ont. July–Sept. Fig. 285. Var. setòsus Fernald. Perianth of 4 or 5 slender retrorsely barbed bristles, mostly exceeding the achenes. — Me.; Mass.; and Ill.

285. S. Smithii.

286. S. americanus.

12. **S. americànus** Pers. Running *rootstocks long and stout; culms sharply 3-angled* throughout (0.2–1 m. high) with concave sides; *leaves* 1–3, *elongated* (1–3 dm. long), keeled and channeled; *involucral leaf pointed;* spikelets 1–6, capitate, *ovoid,* mostly 0.5–1 cm. long; *scales* ovate, *sparingly ciliate, 2-cleft at the apex; anthers tipped with an awl-shaped minutely fringed appendage; style 2-cleft* (rarely 3-cleft); bristles 2–6, shorter than the smooth achene. (*S. pungens* Vahl.) — Borders of salt and fresh ponds and streams, temperate N. A. Aug.–Oct. (Eu., S. A.) Fig. 286.

13. **S. Torrèyi** Olney. *Rootstocks slender and weak; culm 3-angled,* with concave sides, rather slender (0.4–1.5 m. high), *leafy at base; leaves* 2 *or* 3, *more than half the length of the culm,* triangular-channeled, slender; *involucral leaf blunt; spikelets* 1–4, *oblong or spindle-shaped, acute, distinct,* 1–1.5 cm. long; scales ovate, smooth, barely mucronate; *style 3-cleft; bristles longer than the unequally triangular very smooth long-pointed achene.* — Borders of ponds, brackish and fresh, Me. to Pa., Ia., and Man. Aug., Sept. Fig. 287.

287. S. Torreyi.

288. S. Olneyi.

14. **S. Olnèyi** Gray. *Culm 3-wing-angled, with deeply excavated sides,* stout (0.5–2 m. high), the *upper sheath bearing a triangular leaf or none;* spikelets 6–12, closely capitate, ovoid, obtuse, overtopped by the short involucral leaf; scales orbicular, smooth, the inconspicuous mucronate point shorter than the scarious apex; *anthers with a very short and blunt minutely bearded tip; style 2-cleft;* bristles 6, scarcely equaling the narrowly obovate plano-convex and mucronate achene. — Salt marshes, N. H. to Fla.; also in Mich., and on the Pacific coast. July–Sept. (W. I.) Fig. 288.

15. **S. mucronàtus** L. Resembling the last, 3–9 dm. high; *involucral leaf divergent;* spikelets numerous in a dense cluster, oblong-ovoid; scales ovate, mucronate, firm, scarcely at all scarious; *style 3-cleft;* achene unequally trigonous, broadly obovate. — In a single locality in Delaware Co., Pa.; probably introd. from s. Eu.

16. **S. etuberculàtus** (Steud.) Ktze. *Culm* (1–2 m. high) *3-angled,* usually *sharply so above,* obtusely below, the *sheath at base extended into a long slender triangular and channeled leaf;* involucral leaf similar (1–2.5 dm. long), continuing the culm; *spikelets* cylindric (1–2 cm. long), single or sometimes proliferously 2 or 3 together, *nodding on the apex of the 5–9 long filiform and flattened peduncles* or rays of the *dichotomous umbel-like corymb,* or the central one nearly sessile; *scales loosely imbricated,* oblong-ovate, acute, *pale,* thin and scarious, with a *greenish nerved back; bristles* 6, *firm, furnished above with spreading hairs rather than barbs,* equaling the slender abrupt beak of the *obovoid-triangular shining achene* (4 mm. long). (*S. Canbyi* Gray; *S. cylindricus* Britton.) — Swamps and ponds, Md. to Fla., etc. June–Aug. Fig. 289.

289. S. etuberculatus

17. **S. válidus** Vahl. (Great B.) Rootstock stout, scaly, horizontal; culm 0.5–2.5 m. high, 0.8–2.5 cm. thick at base, soft, light green; *basal sheaths soft, with soon lacerate hyaline margin;* decompound panicle lax, the *rays* 1–6 cm. long, *slender and flexuous; bractlets brownish, pubescent at tip, fimbriate-ciliate, with strongly excurrent midrib; spikelets* solitary or in glomerules of 2–5, *rufescent, ovoid,* acutish, 5–10 mm. long; *scales* suborbicular, a little *pubescent on the back,* ciliate, *mucronate;* style 2-cleft; *achene fuscous* or dull black when ripe, broad-obovoid, plano-convex, mucronate, 1.3–1.5 *mm. broad.* (*S. lacustris,* mostly of Am. auth., not L.) — Margins of ponds and quiet streams. July, Aug. Fig. 290.

290. S. validus.

291. S. occidentalis.

18. **S. occidentàlis** (Wats.) Chase. Similar; the culms harder, olive-green; *basal sheaths firmer, the margins becoming fibrillose;* panicle compound, the *rays* 0.5–5 cm. long, *stiff; bractlets red-spotted, viscid at tip, lacerate-fimbriate, abruptly mucronate;* spikelets mostly in glomerules of 2–7, rarely solitary, *drab to reddish-brown, subcylindric,* 1–2 cm. long; *scales* oblong-ovate, aristate, *red-dotted, viscid above; achene* biconvex, 1.7–1.9 *mm. broad.* — Lake-borders, Nfd. to B. C., s. to Mass., N. Y., Great Lakes, Mo., etc. Aug., Sept. Fig. 291.

19. **S. heterochaètus** Chase. Similar; the culms slender, rarely 1 cm. thick at base, pale green; panicle compound, the *suberect very slender rays* 1–9 cm. long; *bractlets pale, aristate-acuminate, glabrous; spikelets* solitary, ellipsoid, 8–14 mm. long, *pale brown; scales* ovate-oblong, exceeding the achenes, emarginate, short-aristate, slightly red-dotted, *glabrous, with erose-fimbriate margins; style 3-cleft; bristles fragile,* 2–4; *achene greenish or yellowish,* 2.5–3 mm. long, 1.7–2 mm. broad. — Marshes and sheltered shores, e. Mass. and Vt. to Ill., Neb., and Ore. July, Aug. Fig. 292.

292. S. heterochaetus.

20. **S. fluviátilis** (Torr.) Gray. (River B.) Culm very stout, 1–1.5 m. high; leaves flat, broadly linear (0.7–2 cm. wide), tapering gradually to a point, the upper and those of the very long involucre very much exceeding the *compound umbel; rays* 5–12, *elongated, recurved-spreading,* each bearing 1–5 ovoid to cylindrical acute pale-brown spikelets (1.5–4 cm. long); scales slightly lacerate, the awns much exceeding the cleft tip; *achene obovoid, sharply and exactly triangular, conspicuously pointed, opaque,* about equaling the 6 rigid bristles. —Borders of lakes and large streams, e. Mass. and Vt. to D. C., w. to Minn., Kan., etc. July–Sept. Fig. 293.

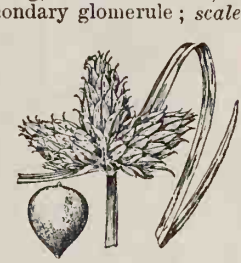
293. S. fluviatilis.

21. **S. robústus** Pursh. *Leaves* flat, *green,* 4–10 mm. broad, as long as or longer than the stout culm (0.7–1.2 m. high), *those of the involucre* 3 *or* 4, very unequal, *the longest* 2.5–4 *dm. long; spikelets* 1–15, *rufescent,* ovoid to cylindric, 1.5–3 cm. long, 6–12 mm. thick, some sessile, the others borne on short (2–6 cm. long)

294. S. robustus.

rays; *scales all pubescent, the awns* soon recurved and *many times exceeding the cleft tip; achene* broadly to narrowly obovoid, compressed, *flat on one side, convex or obtuse-angled on the other*, short-pointed, shining; the bristles unequal and deciduous or obsolete. (*S. maritimus*, in part, Am. authors.) — Brackish or salt marshes, Mass. to Fla. and Tex. July–Sept. Fig. 294.

22. **S. campéstris** Britton. Culms 0.3–1 m. high, usually exceeding the stiff *pale leaves* (3–9 mm. broad); *involucral leaves* 2 (*or* 3), *the longer* 1–2 *dm. long; spikelets whitish-brown*, ovoid to cylindric, 1–2 cm. long, 6–10 mm. thick, 2–11 in a dense glomerule, occasionally a few in a secondary glomerule; *scales puberulent, or the outermost glabrous except at tip*, the slightly curved *awn twice or thrice exceeding the cleft tip.* (*S. maritimus*, in part, of authors.) — Prairies, etc., Man. and Minn., westw. and southw. Var. PALUDÒSUS (A. Nelson) Fernald. Similar, but with the *scales drab to castaneous.* (*S. paludosus* A. Nelson.) — Alkaline situations inland, and in salt marshes, Gulf of St. Lawrence to N. J. July–Sept. Fig. 295. Var. NÒVAE-ÁNGLIAE (Britton) Fernald. Usually taller (1–2 m. high); the involucral leaves 3 to 5, the longest 2–3.5 dm. long; the *looser inflorescence with* 3 to 9 *curved rays* (2–10 cm. long); *spikelets dark brown, cylindric*, 2–5 *cm. long.* (*S. novae-angliae* Britton.) — Mass. to s. N. Y.; also w. N. Y. Passing to Var. FERNÁLDI (Bicknell) Bartlett. *Spikelets* short-ovoid, 1–2 *cm. long, on mostly elongate rays.* (*S. Fernaldi* Bicknell.) — Me. to Mass.



295. S. camp., v. palud.

23. **S. rubrotínctus** Fernald. Culm rather stout, 4–9 dm. high; leaves broadly linear, the upper equaling or slightly exceeding the inflorescence, the sheaths mostly red-tinged at base, the *blades smooth*, 4–13 mm. broad; involucral leaves mostly 3, the longest equaling or exceeding the inflorescence; *rays numerous, the* 3–5 *longest* ones 0.5–1.5 *dm. long, stiff*, ascending, subequal, the many shorter ascending and divergent; spikelets 4–9 mm. long, ovoid to cylindric, in glomerules of from 3 to many; scales ovate, blunt, or the terminal mucronate, finely suffused with green and black; *stamens* 2. (*S. sylvaticus*, var. *digynus* Man. ed. 6, not Boeckl.) — Damp open soil, Nfd. to Assina., s. to Ct., N. Y., Great Lakes, etc. Fr. July, early Aug. Fig. 296. Var. CONFÉRTUS Fernald. Glomerules compacted into dense clusters 1.5–4 cm. across. — Nfd. to Me., local.

296. S. rubrotinctus.

24. **S. sylváticus** L. Similar; tall and coarse, 0.5–2 m. high; upper sheaths mostly green, *leaf-blades with scabrous margins*, 1–2 cm. broad; *rays very numerous*, mostly *ascending but flexuous, the* 1–4 *longest* 0.5–4 *dm. long;* spikelets 3–5 mm. long, ovoid, in glomerules of from 2–8; *stamens* 3. — By brooks and in wet swamps, s. Me. to Fla., and Mich. Fr. Aug. (Eurasia.) Fig. 297.

Var. **Bissélii** Fernald. Spikelets cylindric, 6–14 mm. long, mostly 5–20 in a glomerule. — Local, Ct. and N. Y. — An anomalous plant, combining characteristics of *S. sylvaticus* and *S. rubrotinctus;* fruiting earlier than the former, later than the latter.

25. **S. atróvirens** Muhl. Rather stout, 0.8–1.5 m. high; *leaves pale green, with scabrous margins*, 7–15 mm. wide, at least *the lower nodulose-reticulate*, the ribs 0.25–0.3 mm. apart; spikelets dull greenish-brown or rufescent, narrowly ovoid to

297. S sylvaticus.

cylindric, 3.5–8 (rarely 10) mm. long, in glomerules of 10–30; *scales* 1.5–2 *mm. long;* bristles sparsely and strongly barbed, nearly straight, as long as the conspicuously pointed and obovoid-oblong trigonous achene. — Meadows and bogs, Me. to Sask., s. to Ga. and Mo. Fr. late July, Aug. Fig. 298. Var. PYCNOCÉPHALUS Fernald. Rays abbreviated; glomerules crowded in a dense irregular head. — Flats of the Mohawk R., N. Y., local (*Haberer*).

298. S. atrovirens.

26. **S. pállidus** (Britton) Fernald. Similar; *leaves very pale;* spikelets pale brown, very numerous in *irregular glomerules; scales* 2–3 *mm. long, with the conspicuous pale midribs prolonged into long setulose awns.* (*S. atrovirens*, var. Britton.) — Man. to Kan. and the Rocky Mts. Fr. July. Fig. 299.

299. S. pallidus.

27. **S. georgiànus** Harper. Slender, 3–12 dm. high, *bright green; leaves smooth, rarely nodulose below*, numerous, crowded at base, 0.5–1 cm. broad, the ribs 0.15–0.2 mm. apart; spikelets 2–4 mm. long, numerous in the glomerules; the greenish-brown or rufescent *scales mucronate*, 1–1.5 *mm. long*, slightly exceeding the ellipsoid achenes. — Que. to Mich., Ga., and Ark. Fr. July. — Occasionally proliferous.

300. S. polyphyllus.

28. **S. polyphýllus** Vahl. Culm usually very leafy; *spikelets yellow-brown* or reddish, ovoid, 2.5–3 mm. long, *clustered* 3–8 *together in small heads* on the short ultimate divisions of the *open decompound umbel;* scales rounded, mucronate, 1–1.5 mm. long, about equaling the broadly obovoid short-tipped achene; *bristles* 6, *usually twice bent*, about twice the length of the achene. — Swamps and borders of ponds, w. N. E. to Ga., w. to Minn. and Ark. July–Sept. — Often proliferous. Fig. 300. Var. MACRÓSTACHYS Boeckl. Spikelets cylindric, 5–8 mm. long. — Local, Ct. and N. Y.

29. **S. divaricàtus** Ell. Slender, *weak*, 0.5–1.5 m. high; *leaves* very numerous, *deep green, soft and smooth*, 4–10 mm. wide; inflorescence loose, often proliferous, with *elongated widely divergent flexuous rays;* spikelets mostly pediceled, very slender, cylindric, at first 3 or 4 mm. long, the axis elongating to 1 cm., 1–2 mm. thick; *scales whitish or pale brown, blunt, incurved, with broad green midrib;* achene firm, sharply trigonous, ovoid, apiculate. — Swamps, etc., Va. to Mo., and southw. June–Aug. Fig. 301.

301. S. divaricatus.

302. S. lineatus.

30. **S. lineàtus** Michx. Culms remotely leafy, 0.5–1.5 m. high; *leaves* linear, flat, *pale green, stiff*, rather broad (0.5–1 cm. wide), *rough on the margins; involucre and involucels pale brown at base; umbels* terminal and sometimes axillary, loose, 0.5–2 dm. high, *subsecund*, the terminal with a 1–3-leaved involucre much shorter than the long slender *ascending, nodding-tipped rays; spikelets* oblong, becoming cylindrical (0.5–1 cm. long), *on thread-like drooping pedicels; scales pale brown*, ovate, *green-keeled*, pointed, *the tips ascending, not appressed; achene firm, brown*, sharp-pointed. (*Eriophorum* B. & H.) — Low grounds, Vt. to Ga., and westw. June–Aug. Fig. 302.

31. **S. Péckii** Britton. Culms slender, 0.8–1.7 m. high; *leaves pale green*, 5–9 mm. broad, the *margins scabrous; involucre and involucels blackish at base;* inflorescence 0.5–2 dm. high, the 2–5 longest *stiff rays ascending*, the others shorter, ascending or divergent, *the tips scarcely drooping; spikelets* oblong-cylindric, 5–9 mm. long, *mostly sessile or subsessile in glomerules of*

2–7; *scales* oblong-ovate, acutish or obtuse, *blackish-ferruginous* above the pale base; *achene soft, whitish, oblong.* — Meadows and bogs, N. H., Vt., and n. N. Y. July, Aug. Fig. 303.

303. S. Peckii.

32. **S. cyperìnus** (L.) Kunth. (Wool Grass.) Culm nearly terete (1–1.5 m. high); leaves narrowly linear, long, rigid, those of the *involucre* 3–5, *longer than the loose umbel* (1.5–3 dm. long), the tips of the rays at length drooping; *involucels reddish-brown; spikelets* exceedingly *numerous, ovoid, clustered,* woolly at maturity (3–6 mm. long); the *rust-colored bristles much longer than the pointless reddish-brown scales;* achene short-pointed. (*Eriophorum* L.) — Wet meadows and swamps, N. E. to Va., Tenn., and Ark. Aug., Sept. Fig. 304. Var. Andrewsii Fernald. *Involucels reddish-brown; spikelets cylindric,* 7–10 *mm. long.* — Local, Ct.

304. S cyperinus.

Var. **pèlius** Fernald. *Involucels blackish at base; bristles drab or smoke-color.* — The common form northw.; Nfd. to Ont., s. to Ct., N. Y., and Mich. — Perhaps distinct. Var. condensàtus Fernald. Similar, but with rays all or nearly all abbreviated, the *glomerules in dense irregular masses.* — Local, range of last. Aug.–Oct.

33. **S. Eriòphorum** Michx. *Coarse and tall* (1–2 m.); the culm 2.5–6 mm. thick below the ample (1.5–3 dm. high) inflorescence; *leaves pale green, firm,* 6–11 *mm. broad;* rays very elongate, mostly ascending, drooping at tip; the *involucels deep red-brown or terra-cotta;* spikelets ovoid, 3–6 mm. long, the lateral pediceled; *scales red-brown;* wool slightly paler. — Mostly near the coast, Ct. to Fla., La., and Ark. July–Sept.

34. **S. pedicellàtus** Fernald. Similar; the culm rather stout (2–4 mm. thick below the inflorescence); *leaves pale green, firm,* 3–10 *mm. broad;* inflorescence ample, 1–2.5 dm. high, the numerous ascending subequal rays very slender, with nodding tips; *involucels brown to dull straw-color;* spikelets 3–6 mm. long; *scales pale brown; wool whitish-brown.* — Alluvial thickets and swamps, e. Que. to Ct., N. Y., and Wis., mostly in the interior. July, Aug. Fig. 305. — Ordinarily very distinct, occasionally approaching the preceding or the following as in Var. púllus Fernald. *Spikelets dull brown or drab,* 7–10 *mm. long.* — Local, and perhaps as nearly related to the next (including *S. atrocinctus,* var. *grandis* Fernald).

305. S. pedicellatus.

35. **S. atrocínctus** Fernald. *Slender* (0.5–1.2 m. high); the culm 1–2 mm. in diameter below the inflorescence; *leaves bright green, rather soft,* 2–5 *mm. broad;* inflorescence 0.5–1.8 dm. high, the slender rays very unequal; *involucels and base of involucre black;* spikelets 2.5–6 mm. long, mostly pediceled; *scales greenish-black; wool drab or olive-brown.* — Meadows and swamps, abundant northw.; Nfd. to Hudson Bay and Sask., s. to Ct., Pa., Mich., and Ia. June, July (Aug. in colder regions). Var. brachýpodus Fernald. *Spikelets* on shortened pedicels, *in irregular dense clusters;* rays usually much reduced. — Frequently occupying large areas, especially northw. and at higher altitudes than the typical form.

10. ERIÓPHORUM L. Cotton Grass

Bristles naked, very numerous, silky and becoming greatly elongated. Otherwise as in *Scirpus.* — Spikelets single or clustered or umbellate, when involucrate with leaf-like bracts, upon a leafy or naked stem; scales membranaceous, 1–5-nerved, some of the lowest usually empty. Style very slender and elongated.

3-cleft. Achene acutely triangular. (Name composed of ἔριον, *wool* or *cotton*, and φορός, *bearing*.)

§ 1. Spikelet solitary; involucre none; the lowest scale of the spikelet enlarged and thickened; stem-leaves reduced to mostly bladeless sheaths *a*.
- *a*. Stoloniferous, culms solitary; empty scales at base of spikelet few (7 or less); flowering spikelet cylindric, in fruit becoming obovoid.
  - Bristles reddish or cinnamon-color . . . . . 1. *E. Chamissonis.*
  - Bristles white . . . . . (1) *E. Chamissonis*, v. *albidum*
- *a*. Nonstoloniferous, culms tufted; empty scales 10–15; flowering spikelet obovoid or globose, in fruit becoming depressed-globose.
  - Densely tufted, the culms very many; upper sheaths distinctly inflated; culm trigonous and scabrous at tip . 2. *E. callitrix.*
  - Loosely tufted, culms very few; upper sheath close; culm terete, glabrous at tip . . . . . 3. *E. opacum.*

§ 2. Spikelets 2–several; involucre of 1–several leafy bracts *b*.
- *b*. Leaves very slender, 1–1.5 mm. broad, triangular-channeled throughout; involucre a single erect short bract.
  - Upper cauline leaf with the sheath longer than the blade . 4. *E. gracile.*
  - Upper cauline leaf with the sheath shorter than the blade . 5. *E. tenellum.*
- *b*. Leaves broader, flat at least below the middle; involucral bracts 2 or more *c*.
  - *c*. Scales of spikelet with only 1 prominent rib; stamens 3.
    - Midrib of scale prominent only below the membranous tip; upper leaf-sheaths dark-girdled at summit.
      - Leaves 1.5–4 mm. broad . . . . . 6. *E. angustifolium.*
      - Leaves 5–8 mm. broad . . . . . (6) *E. angustifolium*, v. *majus.*
    - Midrib prominent to the tip of the scale; leaf-sheaths not dark-girdled.
      - Spikelets mostly peduncled . . . . . 7. *E. viridi-carinatum.*
      - Spikelets sessile in a glomerule . . . (7) *E. viridi-carinatum*, v. *Fellowsii.*
  - *c*. Scales of the spikelet with several prominent ribs; stamen 1.
    - Bristles copper-color or brown . . . . . 8. *E. virginicum.*
    - Bristles white except at base . . . . . (8) *E. virginicum*, v. *album.*

1. **E. Chamissònis** C. A. Mey. *Culms soft*, subterete, 1–8 dm. high; *basal leaves slender, channeled*, the *upper scarcely inflated sheaths* mostly bladeless; flowering spikelet 1.5–2 cm. long; its *scales brownish lead-color* with broad whitish margins, *bluntish; bristles reddish.* (*E. russeolum* Fries.) — Locally in bogs, Lab. to N. S. and N. B.; Ont.; Rocky Mts., etc. Fr. July, Aug. (Eurasia.) Var. ÁLBIDUM (F. Nylander) Fernald. *Bristles white.* — Que. and N. B.; Alaska, etc. (Eurasia.)

2. **E. cállitrix** Cham. (HARE'S TAIL.) *Culms stiff and wiry, densely tufted*, 1.5–7 dm. high; *basal leaves filiform-trigonous, scabrous; upper bladeless sheaths inflated; flowering spikelet* obovoid or globose, 0.8–1.5 *cm. long; scales lead-color* with pale margins, ovate to ovate-lanceolate, *long-acuminate;* fruiting spikelet 2.5–5 cm. broad; *bristles bright white.* (*E. vaginatum* Am. authors, not L.). — Bogs and mountain slopes, Lab. to Alaska, s. to Pa., Mich., Wis., and Man. Fr. May–July. (Asia.)

3. **E. opàcum** (Bjö.nstr.) Fernald. Similar; culms terete, glabrous, filiform, *forming loose small tufts; leaves glabrous; upper sheaths close; flowering spikelet rarely* 1 *cm. long;* scales lead-color, lance-attenuate; fruiting spikelet 2–3.5 cm. broad; *bristles sordid white.* — Locally on bogs, South Ashburnham, Mass. (*Forbes*); Ont. to Sask. and the Rocky Mts. Fr. June, July. (Eurasia.)

4. **E. grácile** Roth. *Weak* and slender, *glabrous*, the *subterete culm* 2–6 dm. high, *with no young basal leaves developed at flowering season; upper cauline leaf-blade smooth, round-tipped*, 1–4 cm. long; *involucre dark at base;* spikelets 2–5, mostly on short slender pubescent peduncles (0.5–3 cm. long), in anthesis 7–10 mm. long, in fruit 1.5–2 cm long; *scales lead-color or blackish; achenes* 1.5–2 *mm. long;* bristles white. — Cold bogs and swamps, Gulf of St. Lawrence to B. C., s. to Ct., Pa., Mich., Neb., and Cal. Fr. May–July. (Eurasia.)

5. **E. tenéllum** Nutt. *Culms stiff, obtusely trigonous, scabrous above*, 3–9 dm. high, *with long slender green pointed basal leaves; upper cauline leaf-blade scabrous, pointed*, 3–18 cm. long; *involucre brown or straw-color at base;* spikelets 3–6, on scabrous peduncles, in fruit 2–2.8 cm. long; *scales greenish*

straw-color to reddish-brown; achenes 2.5–3 *mm. long;* bristles whitish (*E. gracile*, var. *paucinervium* Engelm.; *E. paucinervium* A. A. Eaton.) — Swamps and bogs, Nfd. to Ont., s. to N. J. and Ill. Fr. July, Aug.

6. **E. angustifòlium** Roth. *Culms* 2–6 dm. high, *slender*, obtusely angled; *basal leaves broad, conduplicate above the middle; cauline leaves few, stiff, flat at base*, 1.5–15 *cm. long*, 1.5–4 *mm. broad*, scabrous on the margins; *spikelets* 2–10, mostly *on stout glabrous or glabrate peduncles* (0.5–7 cm. long), *in anthesis ovoid*, 1–2 *cm. long, in fruit* 2.5–4.5 *cm. long; scales* lead-color to castaneous, 4–10 mm. long, *the nerveless tip membranous; anthers* 2.5–5 *mm. long;* achenes 2.7–3.5 mm. long; *bristles bright white.* (*E. polystachion* L., in part.) — Cold bogs, Arctic Am., s. to Nfd., N. S., N. B., Me., L. Superior, etc. Fr. June, July. (Eurasia.) Var. MAJUS Schultz. *Stout* and tall (3–9 dm.); *the leaves* 4–8 *mm. broad.* — South to Me., Ont., Ill., Wisc., Ia., etc. (Eurasia.)

7. **E. víridi-carinàtum** (Engelm.) Fernald. Culms 2–9 dm. high; *leaves flat except at tip*, 2–6 mm. wide; *spikelets* 3–30, *on slender simple or forked minutely hairy peduncles, in anthesis slender-ovoid*, 6–10 *mm. long, in fruit* 1.5–3 *cm. long; scales* greenish-drab to lead-color, *the prominent often scabrous midrib extending to the tip; anthers* 1–1.25 *mm. long; bristles whitish or pale buff.* (*E. polystachion* of most Am. authors.) — Bogs and wet meadows, Nfd. to Sask. and B. C., s. to Ct., N. Y., O., Mich., Wis., and said to extend to Ga. Fr. May–Aug. Var. FELLOWSII Fernald. *Spikelets all sessile.* — Local, Me. and Mass.

8. **E. virgínicum** L. *Culms wiry*, terete below, trigonous above, smooth, 4–12 dm. high; *leaves flat, stiff, elongate-linear, with close sheaths*, the uppermost 1–2.5 dm. long, 1.5–4 mm. wide; involucral bracts somewhat divergent; *spikelets mostly crowded in a dense glomerule*, in anthesis 6–10 mm. long, *in fruit* 1–2 *cm. long; scales with strongly striate-ribbed greenish or straw-colored body and thin nerveless red-brown margin; bristles tawny or copper-color.* — Bogs and meadows, Nfd. to Ont. and Minn., s. to Ga. Fr. July–Sept. Var. ÁLBUM Gray. *Bristles whitish.* — Ct. and N. Y.

11. FUIRÈNA Rottb. UMBRELLA GRASS

Spikelets many-flowered, terete, clustered or solitary, axillary and terminal. Scales imbricated in many ranks, awned below the apex, all floriferous. Perianth of 3 ovate or heart-shaped petaloid scales, mostly on claws, and usually with as many alternating small bristles. Stamens 3. Style 3-cleft. Achene triangular, pointed with the persistent base of the style. — Culms from a usually perennial root, obtusely triangular. (Named for *G. Fuiren*, a Danish botanist.)

306. F. squarrosa.

1. **F. squarròsa** Michx. *Annual*, 0.5–3 dm. high; stems glabrous; leaf-sheaths more or less hispid; spikelets 2–8; *perianth-scales narrowly to broadly oblong or ovate*, long-stipitate and *attenuate to a long retrorsely barbed awn;* barbed *bristles* usually *exceeding the yellow-brown achene*, which is *equaled by the persistent style.* (Var. *pumila* Torr.) — Sandy shores and swamps, Mass. to Fla.; Mich. and Ind. Aug.–Oct. FIG. 306.

2. **F. híspida** Ell. *Perennial;* stem (2.5–8 dm. high) leafy; leaves and sheaths densely hairy; spikelets ellipsoid (0.5–1.2 cm. long), bristly with the spreading awns of the scales; *perianth-scales rhombic or deltoid-ovate*, with a short thick *smooth terminal awn or point*, the interposed mostly barbed *bristles shorter than the yellow achene*, which is twice as long as the persistent style. (*F. squarrosa*, var. Chapm.) — Sandy wet places, N. J. to Fla. and Tex., n. in the low country to Ky. and I. T. July–Oct. FIG. 307.

307. F. hispida. Fruit × 2⅔.

308. F. simplex. Fruit × 2⅔.

3. **F. símplex** Vahl. Perennial, 1–8 dm. high; leaf-sheaths hairy; *perianth-scales* ovate-oblong, *the retrorsely barbed awns arising from below the tip, bristles equaling or exceeding the white achene.* — Sandy or saline soil, Mo. and Kan. to Mex. Aug.–Oct. Fig. 308.

12. HEMICÁRPHA Nees & Arn.

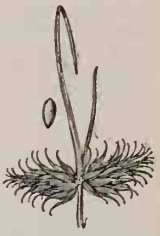
Spikelet, flowers, etc., as in *Scirpus*, except that there is a minute translucent scale (readily overlooked) between the flower and the axis of the spikelet. Stamen only 1. Style 2-cleft. Bristles or other perianth none. (Name from ἡμι-, *half*, and κάρφος, *straw* or *chaff*, in allusion to the single inner scalelet.)

309. H. micrantha. Plant × ⅔. Spikelet × 2⅔. Achene × 10.

310. H. Drummondi. Spikelet × 2⅔. Achene × 10.

1. **H. micrántha** (Vahl) Britton. Dwarf or minute annual (0.2–15 dm. high); involucre 1-leaved, as if a continuation of the bristle-like culm, and usually with another minute leaf; *spikelets*, 1–3, *short-cylindric or ovoid* (2–4 mm. long); *scales oblong or narrowly obovate*, brown, *tipped with a short recurved point; achenes cylindric, brown, slightly reticulated, with many close rows of crowded low papillae.* (*H. subsquarrosa* Nees.) — Sandy borders of ponds and rivers, N. H. to Fla., w. to the Pacific; chiefly on the coastal plain and in the flat country of the interior. Aug.–Oct. (Mex., S. A.) Fig. 309.

2. **H. Drummóndi** Nees. Similar; *scales broadly obovate or rhombic, the broad green midrib barely projecting as a blunt appressed tip;* achenes narrowly obovoid, ashy, scarcely reticulated, the papillae fewer and somewhat remote. — Damp sand, etc., w. Ont., Ind., and Ill. to Ark., Kan., and Tex. July–Oct. Fig. 310.



311. H. occidentalis. Spikelets × 2⅔. Achene × 10.

3. **H. occidentàlis** Gray. *Spikelets globose, the wide-spreading lanceolate or narrowly ovate scales tapering to slender recurved awns (as long as the blades);* achenes as in the latter. — Damp sand, w. Ont.; Wash. to Cal. July–Oct. Fig. 311.

13. LIPOCÁRPHA R. Br.

312. L. maculata.

Spikelets terete, many-flowered, in a terminal close cluster involucrate by leafy bracts. Scales spatulate, regularly imbricated in many ranks, awnless, deciduous, a few of the lowest empty. Inner scales (bractlets) 2 to each flower, thin, one between the scale of the spikelet and the flower, one between the latter and the axis of the spikelet. Stamens 1 or 2. Style 2–3-cleft. Achene flattish or triangular, naked at the tip. — Culms leafy at base. (Name formed of λίπος, *fat*, and κάρφος, *chaff*, from the thickness of the inner scales of some species.)

1. **L. maculàta** (Michx.) Torr. Annual; culm (0.5–2.5 dm. high) much longer than the linear concave leaves; spikelets (3–7 mm. long) green and dark-spotted; inner scales delicate; stamen 1; achene oblong with a contracted base. — Springy or miry places, Va. to Fla.; near Philadelphia, probably adv. July–Oct. Fig. 312.

14. RYNCHÓSPORA Vahl. Beak Rush

Spikelets panicled or variously clustered, ovate, globular, or spindle-shaped, terete, or sometimes flattish; but the scales open or barely concave (not boat-shaped nor keeled); the lower commonly loosely imbricated and empty, the uppermost often subtending imperfect flowers. Perianth of bristles. Stamens mostly 3. Achene lenticular, globular, or flat, crowned with a conspicuous tubercle or beak consisting of the persistent indurated base or even of the greater part of the style. — Chiefly perennials, with more or less triangular and leafy culms; the spikelets in terminal and axillary clusters; flowering in summer. (Name composed of ῥύγχος, *a snout*, and σπορά, *a seed*, from the beaked achene.)

313. R. corniculata.

§ 1. *Spikelets lanceolate, acuminate, in fruit flattish, cymose-panicled, of only one perfect and* 1–4 *staminate flowers; scales few; bristles rigid, minutely scabrous upward; style simple or barely* 2-*toothed, filiform and gradually thickened downward, in fruit persistent as an exserted slender awl-shaped upwardly roughened beak, several times longer than the smooth flat obovate achene; coarse perennials; spikelets in flower* 1–1.5, *in fruit (including the projecting beak)* 2–3 *cm. long.*

314. R. macrostachya.

1. **R. corniculàta** (Lam.) Gray. (Horned Rush.) Culm 0.5–2 m. high; leaves 0.6–2 cm. wide; *cymes decompound, diffuse; bristles awl-shaped*, stout, unequal, *shorter than the achene.* — Wet places on the coastal plain, Del. and Pa. to Fla. and Tex., locally northw. in the Miss. Basin to Mo., Ind., and O. June–Sept. Fig. 313.

2. **R. macrostàchya** Torr. *Erect* and rather stiff; the *glomerules mostly of* 10–50 *spikelets, strongly ascending, sessile or on few short rays; bristles capillary, twice the length of the achene.* — Borders of ponds, Mass. to Fla. and Tex., locally northw. in the Miss. Basin to Kan. and Ind. Aug.–Oct. Fig. 314.

Var. **inundàta** (Oakes) Fernald. *Cyme loosely decompound*, the *numerous rays wide-spreading* or flexuous; the spikelets solitary or 2–6 in loose glomerules. (Var. *patula* Chapm.) — Mass. to Fla.

§ 2. *Spikelets terete or biconvex, few–many-flowered; style conspicuously* 2-*cleft, its base only forming the tubercle of the mostly lenticular achene; bristles usually present, merely rough or barbed-denticulate (rarely plumose).*

* *Achene transversely wrinkled; bristles mostly* 6, *upwardly denticulate.*

3. **R. cymòsa** Ell. *Culm* slender 0.3–1 m. high, *triangular; leaves linear* (1–4 *mm. wide*); cymes corymbose, the brown *spikelets crowded and clustered; achene round-obovoid*, faintly wrinkled, twice the length of the bristles, four times the length of the depressed-conical narrow tubercle. — Low grounds, N. J., Pa., Ill., and southw. June–Aug. (W. I., S. A.) Fig. 315.

316. R. compressa.

4. **R. compréssa** Carey. Similar; culm rather stout; *leaves* pale and firm, 3–7 *mm. wide; achene strongly wrinkled, the tubercle with broad depressed thin-edged base.* — Ga. and Fla. to La., northw. in the low country to Mo. July. Fig. 316.

315. R. cymosa.

317. R. Torreyana.

5. **R. Torreyána** Gray. *Culm nearly terete, slender; leaves involute-filiform;* cymes panicled, somewhat loose, the ascending brown *spikelets mostly pediceled; achene* compressed, *oblong-obovoid*, longer than the bristles, thrice the length of the broad compressed-conical tubercle. — Swamps and bogs, East Washington, N. H. (*C. F. Parker*); pine-barrens of N. J. to Ga. July–Oct. Fig. 317.

6. **R. inexpánsa** (Michx.) Vahl. *Culm triangular*, slender; *leaves narrowly linear*, 2–3 mm. wide, becoming involute; *spikelets spindle-shaped, mostly pediceled, in drooping panicles; achene oblong*, half the length of the slender bristles, twice the length of the triangular-subulate tubercle. — Low grounds, Va. to Ga. July–Sept. Fig. 318.

318. R. inexpansa.

* * *Achene smooth and even.*

+ *Bristles* 6, *long and conspicuous, upwardly denticulate.*

319. R. fusca.

7. **R. fúsca** (L.) Ait. f. Loosely stoloniferous; culm 2–6 dm. high; *leaves bristle-form, channeled;* spikelets ovoid-fusiform, few, clustered in 1–4 loose heads (chestnut-color) overtopped by the slender bracts; *achene obovoid, about* ⅓ *the length of the bristles*, nearly equaling the triangular-sword-shaped acute tubercle, which is rough-serrulate on the margins. — Boggy places, Nfd. to Ont., s. to Del. and Mich. July–Sept. (Eu.) Fig. 319.

320. R. gracilenta.

8. **R. gracilénta** Gray. Culms very slender, 3–8 dm. high; *leaves narrowly linear;* spikelets ovoid, in 2–4 small clusters, the lateral long-peduncled; *achene ovoid, rather shorter than the bristles*, about the length of the flat-awl-shaped tubercle. — Low grounds, s. N. Y. and N. J. to Fla. Aug., Sept. (W. I., S. A.) Fig. 320.

321. R. oligantha.

9. **R. oligántha** Gray. Culm and leaves filiform, 1.5–4 dm. high; spikelets very few (1–4), ovoid-fusiform; *bristles plumose below the middle;* achene obovoid-oblong, bearing a conical tubercle ⅓ its length. — Del. to Fla. July, Aug. Fig. 321.

+ + *Bristles none, or* 1–3 *and minute; spikelets pale,* 1-*flowered.*

322. R. pallida.

10. **R. pállida** M. A. Curtis. Culm (3–8 dm. high) acutely triangular; leaves and *spikelets* as in the next species, but *only a terminal dense cluster, which* is less white or *turns pale reddish-tawny;* achene obovoid-lenticular, tipped with a *minute depressed and apiculate tubercle;* the delicate bristles 4–5 times shorter or obsolete. — Bogs in pine-barrens, N. J. and N. C. Aug., Sept. (W. I., S. A.) Fig. 322.

+ + + *Bristles long, denticulate downward, or both ways in* no. 15.

++ *Spikelets white or whitish, becoming tawny with age, perfecting only a single flower; stamens usually* 2; *bristles* 9–12, *or even* 20.

11. **R. álba** (L.) Vahl. Culm slender (1.5–6 dm. high), triangular above; leaves narrowly linear or almost bristle-form; spikelets lanceolate, densely crowded in a head-like terminal corymb (0.5–1.5 cm. broad) and usually one or two lateral ones; achene oblong-obovate with a narrowed base, scarcely longer than the flattened-awl-shaped tubercle, shorter than the bristles. — Bogs, Nfd.

to Alaska, s. to Fla., Ky., the Great Lake region, and n. Cal. July–Sept. (Eurasia, Porto Rico.) Fig. 323. Var. MÀCRA Clarke. Coarser, 4–8 dm. high; terminal corymb often 2–4 cm. broad. — The common southern form, extending n. to central N. Y. and Mass.

323. R. alba.

++ ++ *Spikelets chestnut-colored, few–several-flowered; stamens* 3; *bristles usually* 6.

324. R. capillacea.

12. **R. capillàcea** Torr. Culm 1–4.5 dm. high, slender; *leaves bristle-form; spikelets* 3–6 *in a terminal cluster*, and commonly 1 or 2 on approximate or remote axilliary peduncles, *oblong-lanceolate* (pale chestnut-color); *achene oblong-ovoid*, stipitate, very obscurely wrinkled, about *half the length of the* (6, rarely 12) *stout bristles*, and twice the length of the lanceolate-beaked tubercle. — Marly bogs and wet limestone rocks, e. Que. to w. Ont., s. very locally to N. J., Pa., O., Mich., and Mo. July–Sept. Fig. 324. Var. LEVISÈTA E. J. Hill. Bristles perfectly smooth. — Local, Me., Ont., Mich., and Ind.

325. R. Knieskernii.

13. **R. Knieskérnii** Carey. Culm 1–6 dm. high, slender; *leaves narrowly linear*, short; *spikelets numerous, crowded in* 4–6 *distant clusters, oblong-ovoid*, 2–3 mm. long; *achene obovoid*, narrowed at base, *equaling the bristles*, twice the length of the triangular flattened tubercle. — Pine-barrens of N. J. (on bog iron ore exclusively) to Va.; rare. July–Sept. Fig. 325.

14. **R. glomeràta** (L.) Vahl. Culms 0.1–1 m. high; *leaves linear, flat; spikelets numerous in distant clusters or heads* (0.5–1.5 cm. broad) often in pairs from the same sheath, *ovoid-oblong;* achene obovoid, margined, narrowed at base, as long as the lance awl-shaped flattened tubercle, which equals the always *downwardly barbed bristles.* — Low grounds, N. B. to Ont., and southw. July–Sept. Fig. 326. Var. DISCÙTIENS Clarke. Bristles barbed only at the tip or quite smooth. — N. J., and southw.

326. R. glomerata.

Var. **paniculàta** (Gray) Chapm. Coarse and tall (1–2 m.); the very elongate inflorescence bearing numerous loose clusters of heads. — Md. and Ind., southw.

327. R. axillaris.

15. **R. axillàris** (Lam.) Britton. Culm stout (0.4–1.2 m. high); *leaves narrowly linear, flat, keeled; spikelets very numerous, crowded in* 2 *or* 3 *or more dense globular heads* (1.5–2.5 *cm. thick*), which are distant (and often in pairs), *oblong-lanceolate*, dark brown; achene orbicular-obovoid, margined, narrowed at base, 2–2.5 mm. long, about as long as the awl-shaped beak; *bristles* twice longer, stout, *barbed downward and sometimes also upward.* (*R. cephalantha* Gray.) — Sandy swamps, L. I. and N. J. to Fla. and La. Aug.–Oct. Fig. 327.

Var. **microcéphala** Britton. More slender, and usually lower; glomerules 0.7–1.5 cm. thick; achenes smaller. — N. J. to Fla. and La.

15. CLÀDIUM P. Br. Twig Rush

Spikelets ovoid or oblong, of several loosely imbricated scales; the lower empty, one or two above bearing a staminate or imperfect flower; the terminal flower perfect and fertile. Perianth none. Stamens 2. Style 2–3-cleft, deciduous. Achene ovoid or globular, somewhat corky at the summit, or pointed, without any tubercle, in which it differs from *Rynchospora*. (Diminutive of κλάδος, *a branch*, from the repeatedly branched cyme of the original pecies.)

1. **C. mariscoìdes** (Muhl.) Torr. Perennial; culm obscurely triangular

328. C. mariscoides.

(0.4–1 m. high); *leaves narrow* (1–3 *mm. wide*), *channeled, scarcely rough-margined; panicle* 0.5–3 *dm. long*, 2–5 *cm. broad*, of 2–4 umbelliform cymes, the rays rigidly ascending; spikelets clustered in heads 3–10 together on few peduncles; *achene miter-shaped, the truncate base slightly flaring.* — Bogs and wet sandy shores, either fresh or brackish, N. S. to Ont., s. to Fla., Ky., Ind., and Ia. Aug.–Oct. Fig. 328.

2. **C. jamaicénse** Crantz. (Saw Grass.) Tall (1–3 m.) and coarse; *leaves broad* (0.5–1 *cm.*), *stiff and flat, the margins and midrib beneath harshly serrate; panicle* 3–9 *dm. long*, the numerous rays bearing abundant fascicled small chestnut-colored spikelets; *achene obovoid, the truncate base not flaring.* (*C. effusum* Torr.) — Shallow water, Va. to Fla. and Tex. (W. I.) Fig. 329.

329. C. jamaicense.

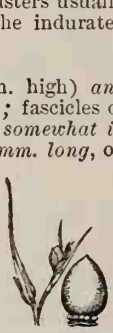
16. SCLÈRIA Bergius. Nut Rush

Flowers monoecious; the fertile spikelets 1-flowered, usually intermixed with clusters of few-flowered staminate spikelets. Scales loosely imbricated, the lower empty. Stamens 1–3. Style 3-cleft. Achene globular, stony, bony, or enamel-like in texture. — Perennials, with triangular leafy culms, mostly from creeping rootstocks; flowering in summer; all in low ground or swamps. Inflorescence, in our species, of terminal and axillary clusters, the lower clusters usually peduncled. (Name σκληρία, *hardness*, from the indurated fruit.)

330. S. triglomerata.

* *Achene smooth.*

1. **S. triglomeràta** Michx. *Culm* (0.5–1 m. high) *and broadly linear* (3.5–9 *mm. wide*) *leaves roughish;* fascicles of spikelets few, the lowest peduncled, the upper *somewhat in threes; achene ovoid-globose* or depressed, 2–3 *mm. long*, on an obscure crustaceous disk. — Low, usually sandy soil, e. Mass. and Vt. (according to *John Torrey*) to Ont., Ia., and southw. June–Aug. Fig. 330. Var. gracilis Britton. Culms slender (3–6 dm. long); leaves narrower; *fascicles* few-flowered, *the lower* (2–3-*flowered*) *on very long filiform peduncles; achene narrower*, 1–1.5 *mm. long*, acutish. (Var. *minor* Britton.) — N. Y. and N. J.



331. S. oligantha.

2. **S. oligántha** Michx. Culms slender, the angles somewhat winged; *leaves linear* (3–5 mm. wide), *smooth* except the scabrous apex; lateral fascicles 1 or 2, usually on long exserted peduncles; *achene ovoid, on a tuberculate disk.* — Woods, D. C. to Fla. and Tex. May–July. Fig. 331.

** *Achene papillose, granulose or warty.*

332. S. pauciflora.

3. **S. pauciflòra** Muhl. *Smoothish or slightly hairy;* culm slender (2–6 dm. high); leaves narrowly linear, 1–3 mm. broad; fascicles few-flowered, the lateral pedunculate, sessile, or wanting; bracts ciliate; *achene globose*, 1.5–2 *mm. in diameter;* the disk a narrow ring bearing 3 *pairs of distinct minute tubercles.* — Barrens and dryish meadows, N. J. to O., s. to Fla. and Tex. June–Aug. (W. I.) Fig. 332.

Var. **caroliniàna** (Willd.) Wood. Very slender; *leaves, culms and scales very pubescent.* — Local, Mass., O., Ind., and southw.

Var. kansàna Fernald. Very slender and pubescent; *each pair of tubercles bearing a smaller intermediate one.* — Sandy soil, Cherokee Co., Kan. Fig. 333.

333. S. paucif., v. kansana.

334. S. ciliata.

4. **S. ciliàta** Michx. Usually coarser, 0.5–1 m. high, glabrous, or slightly pubescent below; *leaves* firm, 1–2.5 *mm. wide, becoming revolute; fascicles* 1 or 2, *usually solitary*, 0.7–2.5 cm. long; bracts ciliate; *scales smooth; achene* 2–3 *mm. in diameter*, the disk bearing 3 *broad shallow entire or barely notched tubercles.* — Pine-barrens, etc., Va. and Mo. to Fla. and Tex. July, Aug. (W. I.) Fig. 334.

5. **S. Elliòttii** Chapm. Coarser and lower, 3–5 dm. high; the *culms and flat leaves* (2.5–6 *mm. wide*) *pubescent;* fascicles 2 or 3, usually subapproximate, forming an interrupted head 1.5–3.5 cm. long; bracts coarsely ciliate; *scales ciliate on the back;* achene with 3 *low broad tubercles, each 2-lobed.* — Pine-barrens and dry ground, Va. and Mo., southw. May–July. (W. I.) Fig. 335.

335. S. Elliottii.

* * * *Achene reticulated or wrinkled.*

336. S. reticularis.

6. **S. reticulàris** Michx. Culms slender, *erect*, smooth (1.5–7 dm. high); leaves linear (1.5–4 mm. wide), smooth; lateral fascicles 1–3, loose, remote, nearly erect, *on short often included peduncles;* bracts glabrous; *achene* globose, *regularly reticulated and pitted, the pits often vertically arranged*, not hairy, resting upon a double greenish conspicuously 3-lobed disk, the inner appressed to and deciduous with the achene. — Damp sand and pine-barrens, local, e. Mass. to Fla.; n. Ind. Aug., Sept. Fig. 336.

337. S. retic., v. pubescens.

Var. **pubéscens** Britton. Culms weak, *diffuse*, 0.3–1 m. high, slightly scabrous or smooth; leaves linear (2–7 mm. wide), smooth; lateral fascicles loose, on *more or less elongated and drooping filiform peduncles; achene irregularly pitted-reticulated or pitted-rugose with the ridges often somewhat spirally arranged and more or less hairy.* (*S. Torreyana* Walp.; *S. trichopoda* C. Wright.) — Pine-barrens, etc., Ct. and Ind. to Fla. and Tex. (W. I.) Fig. 337.

338. S. verticillata.

7. **S. verticillàta** Muhl. Smooth; culms simple, slender (1–9 dm. high); leaves narrowly linear; *fascicles* 4–6, few-flowered, *sessile in an interrupted spike; achene* globose, somewhat triangular at base, *rough-wrinkled with short elevated ridges; disk obsolete.* — Pine-barrens, damp sand, and wet rocks, Mass. to Ont., Minn., and southw. July–Sept. (W. I.) Fig. 338.

17. KOBRÈSIA Willd.

Spikelets unisexual and one-flowered, or with two flowers (one pistillate, one staminate) in short spikes aggregated in elongate heads or panicles; the pistillate flower consisting of a spathiform glume (homologous with the perigynium of *Carex*) wrapping about the base of the achene and subtended by the scale of the spikelet. — Perennial herbs of northern regions, resembling the first group (*Vigneae*) of *Carex*, but with the perigynium replaced by the open glume which has its margins connate at base. (Named for *von Kobres*, a nobleman of Augsburg and patron of botany in Willdenow's time.)

1. **K. elachycárpa** Fernald. Densely tufted; the wiry compressed culms 2–5.5

339. K. elachycarpa.

dm. high, scabrous above; leaves 1–2 mm. wide, flat, about half as long as the culms; heads slender, 1–2.5 cm. long, of 2–7 remote appressed-ascending spikes; spikes either staminate (clavate), androgynous, or pistillate (ovoid); bracts ovate, concave; glumes ovate, subspathiform, emarginate at tip, more or less marked with green and brown; style with 2 elongate branches, the slender base becoming chartaceous and subpersistent, finally separating from the truncate subterete nerveless pale achene (1.2–1.5 mm. long); stamens 2, the anthers much exceeding the filaments. — Wet banks of Aroostook R., Me.; local. June, July. FIG. 339.

18. CÀREX [Ruppius] L. SEDGE

Flowers unisexual, destitute of floral envelopes, disposed in spikes; the staminate consisting of three stamens, in the axil of a bract, or *scale;* the pistillate comprising a single pistil with a bifid or trifid style, forming in fruit a hard achene, which is inclosed in a sac (*perigynium*) borne in the axil of a bract, or *scale.* Staminate and pistillate flowers borne in different parts of the spike (spike *androgynous*), or in separate spikes on the same culm, or rarely the plant dioecious. — Perennial grass-like herbs with mostly triangular culms, 3-ranked leaves, and spikes in the axils of leafy or scale-like bracts, often aggregated into heads. An exceedingly critical genus, the study of which should be attempted only with complete and fully mature specimens.[1] (The classical Latin name, of obscure signification; derived by some from κείρειν, *to cut*, on account of the sharp leaves — as indicated in the English name *Shear-grass.*)

§ 1. *Spikes mostly uniform and sessile, bearing the staminate flowers at base or apex or sometimes scattered amongst the pistillate; stigmas 2 and achenes lenticular.* — VÍGNEAE [Beauv.] Koch. (For § 2, see p. 209.)

A. **Staminate flowers scattered or at the base of the spikes** (only in exceptional individuals and in the often dioecious *C. gynocrates* and *C. exilis* the entire spike staminate) *B.*
- *B.* PERIGYNIA WITH THIN OR WINGED MARGINS *C.*
  - *C.* Perigynia ascending, the tips only sometimes wide-spreading or recurved, not spongy at base, the margins winged at least toward the beak *D.*
    - *D.* Bracts wanting or setaceous, if broad at most twice as long as the inflorescence *E.*
      - *E.* Strongly stoloniferous; culms rising from an elongated rootstock; perigynia firm, 5–6 mm. long . . . . 4. *C. siccata.*
      - *E.* Not strongly stoloniferous; culms solitary or in stools *F.*
        - *F.* Perigynia less than 2 mm. broad *G.*
          - *G.* Perigynia 5 mm. or more long *H.*
            - *H.* Perigynia 7–10 mm. long; spikes long-cylindric, pointed, 1.5–2.5 cm. long . . . . . 1. *C. muskingumensis.*
            - *H.* Perigynia shorter (or, when exceptionally 7 mm. long, in shorter spikes) *I.*
              - *I.* Perigynia half as broad as long, plump, nerveless or obscurely short-nerved on inner face . . 22. *C. aenea.*
              - *I.* Perigynia one third as broad as long *J.*
                - *J.* Perigynia thin, scale-like, scarcely distended over the achenes, distinctly nerved on the inner face and prominently exceeding the subtending scales.
                - Leaves at most 3 mm. wide; spikes 3–9, glossy brown or straw-colored, pointed.
                - Inflorescence oblong-ovoid or subcylindric, with ascending approximate spikes . . 2 *C. scoparia.*
                - Inflorescence moniliform . . (2) *C. scoparia*, v. *moniliformis.*
                - Inflorescence subglobose or broad-ovoid spikes crowded and divergent . . (2) *C. scoparia*, v. *condensa.*
                - Leaves more than 3 mm. wide; spikes 8–14, green or dull brown, blunt . . . . 3. *C. tribuloides.*

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[1] The perigynial characters are here based on study of mature plants. In general the perigynia at the tip of the spike are less characteristic than those nearer the middle; and, if possible, the latter alone should be used in critical comparisons.

J. Perigynia firm, obviously distended over the achenes, nerveless or obscurely nerved on the inner face, equaled by the subtending scales . . . . . 7. *C. pratensis.*
G Perigynia less than 5 mm. long *K.*
K. Perigynia thin, scale-like, scarcely distended over the achenes; leaves 3–8 mm. broad.
Perigynia with appressed tips.
Inflorescence cylindric; spikes approximate . . . . 8. *C. tribuloides.*
Inflorescence moniliform; spikes scattered . . . (3) *C. tribuloides*, v. *turbata*
Perigynia with spreading tips; inflorescence flexuous (3) *C. tribuloides*, v. *reducta.*
K. Perigynia firm, obviously distended over the achenes *L.*
L. Perigynia elongate-lanceolate or subulate, less than one third as broad as long, at most 1.4 mm. broad.
Tips of the perigynia conspicuously exceeding the lance-subulate dull scales.
Culms 1–4 dm. high; leaves 1–2.5 mm. wide; spikes 3–7 mm. long . . . . . 5. *C. Crawfordii.*
Culms taller; leaves broader; spikes 8–11 mm. long (5) *C. Crawfordii*, v. *vigens.*
Tips of the perigynia equaled by the ovate bluntish glossy dark scales . . . . . 6. *C. oronensis.*
L. Perigynia broader, nearly or quite half as broad as long *M.*
M. Tips of perigynia distinctly exceeding the subtending scales *N.*
N. Leaves 2.5 mm. or more wide *O.*
O. Spikes compactly flowered, the mature perigynia with recurved or spreading tips concealing the scales . 8. *C. cristata.*
O. Spikes with ascending or slightly spreading perigynia; scales apparent *P.*
P. Mature perigynia greenish or pale straw-colored, in loose spikes; inflorescence more than 2.2 cm. long (if shorter, with dark chestnut scales).
Spikes approximate in ovoid or short-cylindric heads.
Scales pale, not strongly contrasting with the perigynia . . . . . 10. *C. mirabilis.*
Scales dark chestnut, strongly contrasting with the perigynia . . . . . (10) *C. mirabilis*, v. *tincta.*
Spikes scattered in a moniliform inflorescence (10) *C. mirabilis*, v. *perlonga.*
P. Mature perigynia brown, in dense spikes; heads at most 2.2 cm. long; scales pale brown . . 18. *C. Bebbii.*
N. Leaves narrower.
Inflorescence stiff, with crowded closely flowered spikes 18. *C. Bebbii.*
Inflorescence flexuous and moniliform, or at least with the loosely flowered spikes scattered . . 11. *C. straminea.*
M. Tips of perigynia equaled by the subtending scales *Q.*
Q. Inflorescence stiff and erect, or at least with spikes approximate.
Spikes brown or ferruginous . . . . . 20. *C. leporina.*
Spikes brownish-white . . . . . 21. *C. xerantica.*
Q. Inflorescence flexuous, or at least with the lower spikes remote.
Perigynia nerveless or minutely short-nerved on the inner face.
Mature perigynia straw-colored or pale brown, one third as broad as long . . . . . 7. *C. pratensis.*
Mature perigynia olive-green or bronze, half as broad as long . . . . . 22. *C. aenea.*
Perigynia with strong ribs the length of the inner face; spikes silvery-green . . . . . 19. *C. foenea.*
?. Perigynia 2 mm. or more broad *R.*
R. Tips of the perigynia distinctly exceeding the subtending scales *S.*
S. Perigynia thin and scale-like, barely distended over the achenes, one fourth to one third as broad as long.
Perigynia 7–10 mm. long . . . . . 1. *C. muskingumensis.*
Perigynia shorter . . . . . 2. *C. scoparia.*
S. Perigynia firmer, obviously distended over the achenes, nearly or quite half as broad as long *T.*
T. Perigynia lance-ovate, about half as broad as long *U.*
U. Leaves 2.5 mm. or more broad . . . . . 10. *C. mirabilis.*
U. Leaves narrower.
Perigynia distinctly about 10-nerved on the inner faces, 4–6 mm. long.
Spikes 8–12 mm. long; perigynia 4.8–6 mm. long . 12. *C. hormathodes.*
Spikes 5–8 mm. long; perigynia 4–5 mm. long (12) *C. hormathodes*, v. *invisa.*
Perigynia 3–5-nerved on the inner faces, mostly less than 4 mm. long.
Perigynia with ascending inconspicuous tips . . 11. *C. straminea.*
Perigynia with divergent conspicuous tips . (11) *C. straminea*, v. *echinodes*
T. Perigynia with broad-ovate to orbicular bodies *V.*
V Inflorescence moniliform and flexuous, with mostly clavate-based spikes.

Spikes brownish-white, of closely appressed obscurely beaked firm perigynia . . . . . 14. *C. silicea.*
Spikes ferruginous; the abrupt slender beaks of the perigynia with loosely ascending or spreading tips . . . . . (12) *C. hormathodes*, v. *Richii*
V. Inflorescence stiff (or, if flexuous, with brown or ferruginous spikes) *W.*
W. Perigynia 5.6–7.7 mm. long, very thin, scale-like, almost transparent; scales blunt . . . . 13. *C. Bicknellii.*
W. Perigynia less than 5.6 mm. long, firm and opaque (when exceptionally longer in *C. alata*, with aristate scales) *X.*
X. Scales long-acuminate or aristate; perigynia 4–5.5 mm. long; achenes oblong.
Spikes green or finally dull brown; scales lance-subulate; perigynia obovate, 2.8–3.7 mm. broad, abruptly narrowed at base . . 15. *C. alata.*
Spikes becoming dark brown or ferruginous; perigynia 2.3–2.8 mm. broad.
Spikes closely approximate; scales ovate-lanceolate; perigynia ovate, tapering gradually to the beak . . . . . 16. *C. suberecta.*
Spikes scattered in a flexuous inflorescence; scales lanceolate; perigynia orbicular, abruptly slender-beaked . . (12) *C. hormathodes*, v. *Richii*
X. Scales blunt or at most acutish.
Spikes gray-green or finally dull brown, with strongly appressed-ascending very firm perigynia 3.5–4 (very rarely 4.5) mm. long 9. *C. albolutescens.*
Spikes straw-colored or ferruginous, with spreading-ascending perigynia 4–5.5 mm. long.
Inflorescence of 5–10 mostly distinct spikes . 17. *C. festucacea.*
Inflorescence of 3–6 approximate spikes (17) *C. festucacea*, v. *brevior*
R. Tips of the perigynia equaled by the subtending scales *Y.*
Y. Inflorescence stiff and erect, or at least with approximate spikes *Z.*
Z. Spikes whitish or gray-green.
Perigynia lance-ovate, 4–4.8 mm. long, nerveless on the inner face, golden-yellow at base . . . 21. *C. xerantica.*
Perigynia broad-ovate to suborbicular.
Perigynia strongly ribbed the length of the inner face, 2 mm. broad . . . . . 19. *C. foenea.*
Perigynia nerveless or faintly nerved on the inner face, broader . . . . . 9. *C. albolutescens.*
Z. Spikes bronze or ferruginous.
Perigynia distinctly concave on the usually nerved inner face; achene 1 mm. broad . . . . . 20. *C. leporina.*
Perigynia flat or convex on the usually nerveless inner face, very plump; achene 2 mm. broad . 23. *C. adusta.*
Y. Inflorescence flexuous, at least the lower spikes remote *a.*
a. Perigynia nerveless or only faintly short-nerved on the inner face.
Perigynia ovate-lanceolate, one third as broad as long; achene 1 mm. broad . . . . . 7. *C. pratensis.*
Perigynia ovate, half as broad as long; achene 1.5 mm. broad . . . . . 22. *C. aenea.*
a. Perigynia distinctly nerved on the inner face.
Perigynia 2.8–4.4 mm. long, at most 2.4 mm. broad, 7–13-ribbed on the inner face, abruptly beaked.
Inflorescence of 4–9 spikes 6–10 mm. long; perigynia 2.8–4 mm. long . . . . . 19. *C. foenea.*
Inflorescence of 6–15 spikes 10–17 mm. long; perigynia 3.5–4.4 mm. long . . . (19) *C. foenea*, v. *perplexa*
Perigynia 4–5.3 mm. long, 2.5–3 mm. broad, 3–5-nerved on the inner face, obscurely broad-beaked 14. *C. silicea.*
D. Bracts leaf-like, much prolonged, the lowest 1–2 dm. long; spikes crowded; perigynia subulate . . . . . 24. *C. sychnocephala.*
C. Perigynia horizontally spreading or reflexed when mature, spongy at base, with thin but scarcely winged margins *b.*
b. Spikes solitary and terminal, pistillate or staminate, or with flowers variously scattered.
Stoloniferous; the filiform culms at most 3 dm. high, from filiform rootstocks . . . . . 25. *C. gynocrates.*
Not stoloniferous; the wiry culms 2–7 dm. high, in caespitose stools . . . . . 26. *C. exilis.*
b. Spikes 2–several *c.*
c. Perigynia broadest at base; beak rough or serrulate *d.*
d. Perigynia at most half as broad as long, finally yellowish, with slender beak nearly equaling the body; scales pointed *e.*

e. Perigynia ovate, 3–4 mm. long.
Spikes at most 12-flowered.
Inflorescence 1–3 cm. long, the 2–6 spikes subapproximate . . . . . 27. *C. stellulata.*
Inflorescence 2–6 cm. long, the 2–4 spikes very remote, the terminal with a clavate base 0.5–1 cm. long . . . . . (27) *C. stellulata*, v. *ormantha.*
Spikes with more flowers.
Leaves 1–2.5 mm. broad; spikes scattered, 12–20-flowered; perigynia less than half as broad as long . . . . . (27) *C. stellulata*, v. *excelsior*
Leaves 2–4 mm. broad; spikes mostly approximate, 15–40-flowered; perigynia half as broad as long . . . . . (27) *C. stellulata*, v. *cephalantha.*
e. Perigynia lanceolate or ovate-lanceolate, 2.5–3 mm. long; inflorescence of 2–6 approximate spikes . (27) *C. stellulata*, v. *angustata*
d. Perigynia more than half as broad as long (narrower only in var. of no. 29), firm, brownish or dark green; beak one fourth to one half as long as the body.
Scales sharp-pointed; leaves 2.5–4.5 mm. broad; inflorescence 1.5–3.5 cm. long; spikes 15–50-flowered; coarse plant . . . . . 28. *C. sterilis.*
Scales blunt; leaves narrower; inflorescence 1–2 cm. long; spikes 5–15-flowered; slender plants.
Leaves 1–2 mm. broad; perigynia faintly nerved or nerveless on the inner face.
Perigynia deltoid-ovate, spreading . . . . 29. *C. scirpoides.*
Perigynia lance-subulate, ascending . . (29) *C. scirpoides*, v. *Josselynii.*
Leaves narrower; perigynia strongly nerved (29) *C. scirpoides*, v. *capillacea.*
c. Perigynia broadest near the middle, less than 2 mm. broad, very thin and conspicuously nerved, with short smooth beak; spikes remote . . . . . 30. *C. seorsa.*

B. PERIGYNIA NOT THIN-WINGED, ASCENDING FROM THE FIRST, PLANO-CONVEX *f.*
f. Perigynia 4 mm. or more long, long-beaked.
Spikes lance-cylindric, in a loose linear-cylindric inflorescence; perigynia 1–1.3 mm. broad, strongly nerved; scales oblong; leaves 1–2.5 mm. broad . . . . . 34. *C. bromoides.*
Spikes ovoid or ovoid-cylindric; perigynia 1.6–1.9 mm. broad, faintly nerved or nerveless; scales ovate; leaves 2–5 mm. broad . . . . . 35. *C. Deweyana.*
f. Perigynia less than 4 mm. long *g.*
g. Perigynia with serrulate beaks or margins *h.*
h. Inflorescence elongate, from slender to thickish-cylindric *i.*
i. Perigynia ovate, broadest at base; spikes mostly or all approximate in a thick cylindric inflorescence . . 31. *C. arcta.*
i. Perigynia broadest near the middle.
Plant glaucous; leaves 2–4 mm. broad; spikes with many appressed-ascending glaucous obscurely beaked perigynia.
Spikes 6–10 mm. long, approximate or the lowest rarely 1.5 cm. apart; perigynia 2.3–3 mm. long . 32. *C. canescens.*
Spikes 4–7 mm. long, subapproximate or remote; perigynia about 2 mm. long . . . (32) *C. canescens*, v. *subloliacea*
Spikes 6–12 mm. long, remote, the lowest 2–4 cm. apart . . . . . (32) *C. canescens*, v. *disjuncta.*
Plant green, not glaucous; leaves 1–2.5 mm. broad; spikes with few loosely spreading dark green or brown distinctly beaked perigynia . . . . . 33. *C. brunnescens.*
h. Inflorescence subglobose, of 2–4 closely approximate subglobose loosely flowered silvery spikes; perigynia oblong, beakless, nerved, 3–3.4 mm. long . . . 36. *C. tenuiflora.*
g. Perigynia smooth throughout *j.*
j. Spikes whitish, silvery green or pale brown.
Inflorescence elongate, at least the lower spikes scattered.
Uppermost spikes divaricate-pedunculate, lowermost subtended by a leaf-like bract; perigynia usually more than 3 mm. long.
Leaves flat, 1–2 mm. broad . . . . . 37. *C. trisperma.*
Leaves setaceous, 0.3–0.5 mm. broad . . (37) *C. trisperma*, v. *Billingsii*
Spikes continuous in a linear-cylindric loose inflorescence, bractless or only short-bracted; perigynia 2–3 mm. long . . . . . 32. *C. canescens.*
Inflorescence subglobose, of 2–4 closely approximate subglobose loosely flowered spikes; perigynia beakless, 3 mm. or more long . . . . . 36. *C. tenuiflora.*
j. Spikes ferruginous or dark brown; terminal spikes with conspicuous clavate base; perigynia abruptly beaked; culms smooth (or harsh only at tips).

Spikes distinct; the lowest 4–5 mm. thick; the terminal 1–1.8 cm. long; perigynia pale, about equaled by the yellowish-brown blunt scales . . . . . 38. *C. norvegica.*
Spikes approximate; the lowest less than 4 mm. thick; plant weak, lax; leaves involute, 0.5–1.5 mm. broad; perigynia pale brown or drab.
Perigynia fusiform . . . . . 39. *C. glareosa.*
Perigynia ovoid . . . . . (39) *C. glareosa*, v. *amphigena.*

h. **Staminate flowers borne at the top of the spikes** *k.*
k. Perigynia ellipsoid-ovoid, scarcely compressed, nearly terete . 40. *C. tenella.*
k Perigynia compressed *l.*
l. Spikes 2 or more in a simple or compound spicate or paniculate inflorescence *m.*
m Rootstocks short and thick; culms in terminal tufts or stools *n.*
n. Spikes green or nearly so when mature (becoming brown only when over-ripe) *o.*
o. Broadest leaves 1–4.5 mm. wide *p.*
p. Perigynia very spongy below the middle, the nerve-like margins inflexed *q.*
q. Perigynia with minutely serrulate margins; scales blunt; spikes mostly remote.
Perigynia quickly becoming squarrose.
Culms erect; spikes 6–15-flowered . . . . 41. *C. rosea.*
Culms loosely spreading; spikes 2–6-flowered (41) *C. rosea*, v. *radiata*
Perigynia ascending in fruit . . . . . (41) *C. rosea*, v. *minor.*
q. Perigynia with smooth margins; scales acuminate; spikes mostly approximate.
Perigynia ovoid . . . . . 42. *C. retroflexa.*
Perigynia lance-subulate . . . . . (42) *C. retroflexa*, v. *texensis*
p. Perigynia of essentially uniform (membranous) texture throughout, not conspicuously spongy below the middle; margins slightly if at all inflexed *r.*
r. Perigynia 4–6 mm. long . . . . . 43. *C. muricata.*
r. Perigynia less than 4 mm. long *s.*
s. Leaves and culms stiff and wiry; heads 2 (rarely 1.5)–4 cm. long.
Perigynia distinctly nerved . . . . . 44. *C. Muhlenbergii.*
Perigynia nerveless . . . . . (44) *C. Muhlenbergii*, v. *enervis.*
s. Leaves and culms soft; heads 0.7–1.5 (rarely 1.8) cm. long.
Perigynia elliptic-ovate, broadest below the middle, narrowest at base . . . . . 45. *C. cephalophora.*
Perigynia cordate-deltoid, broadest at the cordate or subcordate base . . . . . 46. *C. Leavenworthii.*
o. Leaves 5–10 (the narrowest rarely 4.5) mm. wide *t.*
t. Perigynia uniformly firm throughout, the outer face nerveless or very faintly nerved *u.*
u. Perigynia wing-margined to the base; spikes mostly distinct in a moniliform inflorescence . . . . 47. *C. sparganoides.*
u. Perigynia wing-margined only above the middle; spikes approximate in a cylindric or ovoid head.
Perigynia broad-ovate to suborbicular, nearly equaled by the long-pointed scales.
Culms 2–5 dm. high; leaves subbasal . . . . 50. *C. gravida.*
Culms 6–12 dm. high; leaves remote . . (50) *C. gravida*, v. *laxifolia.*
Perigynia lance-ovate, twice as long as the thin white scale . . . . . 48. *C. cephaloidea.*
t. Perigynia spongy below the middle, the outer face prominently ribbed . . . . . 55. *C. conjuncta.*
n. Spikes yellowish or tawny when mature *v.*
v. Perigynia firm and uniform in texture, not spongy nor conspicuously inflated below, the beak shorter than or barely equaling the body *w.*
w. Perigynia straw-color, thin, distinctly flattened on the inner face *x.*
x. Membranous band of the leaf-sheath not cross-puckered; scales acuminate, rarely awned *y.*
y. Leaves 2–3 mm. wide; culms firm, without thin wing-margins . . . . . 43. *C. muricata.*
y. Leaves 4–8 mm. wide; culms soft, with almost wing-like angles.
Beak nearly as long as the narrow-ovate body of the perigynium . . . . . 49. *C. alopecoidea.*
Beak one third as long as the broad-ovate or suborbicular body of the perigynium.
Culms 2–5 dm. high; leaves subbasal . . . 50. *C. gravida.*
Culms 6–12 dm. high; leaves remote (50) *C. gravida*, v. *laxifolia.*
x. Membranous or chartaceous band of the leaf-sheath cross-puckered, at least in age; scales awn-tipped.

Leaves equaling or exceeding the culms . . . 51. *C. vulpinoidea.*
Leaves distinctly shorter than the culms.
Perigynia lanceolate or lance-ovate . . . 52. *C. setacea.*
Perigynia broad-ovate to suborbicular . . (52) *C. setacea*, v. *ambigua.*
w. Perigynia drab to dark brown or purplish, plump, somewhat biconvex.
Perigynia obovoid, narrow-margined, abruptly short-beaked . . . . . 53. *C. decomposita.*
Perigynia ovoid, with rounded margins, tapering gradually to a beak.
Inflorescence dark brown, stiff, dense, spiciform . 54. *C. diandra.*
Inflorescence light brown, flexuous, loose, subpaniculate . . . . . (54) *C. diandra*, v. *ramosa.*
v. Perigynia prominently enlarged and spongy at base, conspicuously nerved, the slender beak much longer than the body.
Perigynia 4–5 mm. long, tapering gradually from base to tip . . . . . 56. *C. stipata.*
Perigynia 6–9 mm. long, abruptly enlarged below into a disk-like base . . . . . 57. *C. crus-corvi.*
m. Rootstock slender and elongate; culms mostly scattered, or if tufted bearing slender stolons at base *z.*
z. Perigynia thin-margined; heads elongate, 2–8 cm. long, of numerous distinct spikes.
Perigynia wing-margined; inner side of leaf-sheath cartilaginous to chartaceous, nerveless . . . . 58. *C. arenaria.*
Perigynia not wing-margined; leaf-sheath green and uniformly ribbed, except at the orifice . . . . . 59. *C. Sartwellii.*
e. Perigynia plump, not thin-margined; heads ovoid to globose, 0.5–1.5 cm. long, of few congested spikes.
Perigynia flat on the inner face, faintly nerved . . 60. *C. stenophylla.*
Perigynia plano-convex, strongly nerved . . . 61. *C. chordorrhiza.*
l. Spike solitary, terminal, globular or short-ovoid . . . . 62. *C. capitata.*

§ 2. *Some of the spikes strictly pistillate; stigmas 3 and achenes trigonous; or, if stigmas 2 and achenes lenticular, some of the spikes peduncled.* EUCAREX *Griseb. A.*

4. **Achenes lenticular or plano-convex; stigmas 2** (very rarely and exceptionally 3); perigynia beakless or very short-beaked, with entire or merely emarginate orifice *B.*
B. Perigynia dull *C.*
C. Scales aristate or subulate-tipped, much exceeding the perigynia; pistillate spikes all peduncled *D.*
D. Scales appressed-ascending; basal sheaths rarely fibrillose.
Awns longer than the blades of the scales; spikes on wide-spreading or drooping capillary peduncles; old leaves revolute . . . . . 63. *C. maritima.*
Awns shorter than the blades of the scales; spikes strongly ascending; old leaves involute . . . . . 64. *C. salina*, v. *cuspidata.*
D. Scales spreading; basal leafless sheaths fibrillose.
Leaf-sheaths glabrous.
Perigynia inflated, wrinkled in drying.
Spikes flexuous or drooping, the pistillate 3.5–10 cm. long . . . . . 65. *C. crinita.*
Spikes suberect or spreading, 1–3.5 cm. long . . (65) *C. crinita*, v. *minor.*
Perigynia tight, not inflated . . . . . (65) *C. crinita* v. *Porteri.*
Leaf-sheaths scabrous-hispid.
Pistillate spikes 2.5–10 cm. long, drooping . . (65) *C. crinita*, v. *gynandra.*
Pistillate spikes suberect or spreading, 1–3.5 cm. long (65) *C. crinita*, v. *simulans.*
C. Scales obtuse or acute, not aristate; if subulate-tipped with the upper spikes mostly sessile *E.*
E. Perigynia compressed, lenticular or plano-convex *F.*
F. Culms solitary or few; lower sheaths slightly if at all fibrillose *G.*
G. Perigynia nerveless *H.*
H. Perigynia plane, not twisted at tip *I.*
I. Culms leafy and tall, somewhat caespitose; leaves scabrous on the veins and margins; basal offshoots chiefly erect *J.*
J. Green, scarcely glaucous; pistillate spikes attenuate at tip . . . . . 64. *C. salina*, v. *cuspidata*
J. Strongly glaucous; pistillate spikes full and rounded at tip.
Scales conspicuous, dark, nearly or quite equaling the perigynia.
Scales blunt or acutish.
Pistillate spikes 3–4.5 mm. thick . . . . 66. *C. aquatilis*

Pistillate spikes 5–8 mm. thick . . (66) *C. aquatilis*, v. *elatior*
Scales cuspidate . . . . . (66) *C. aquatilis*, v. *cuspidata*
Scales bidden by the perigynia . . . (66) *C. aquatilis*, v. *virescens*.
I. Culms low; leaves mostly basal, smooth; basal offshoots chiefly repent . . . . . 67. *C. rigida*.
H. Perigynia elongate, with an empty twisted tip . . 68. *C. torta*.
G. Perigynia nerved.
Caespitose, not stoloniferous; green central portion of the scale about as broad as the darker margins . 69. *C. lenticularis*.
Stoloniferous; green midrib of the purple or blackish scale very slender . . . . . 70. *C. Goodenowii*.
F. Culms numerous in stools; lower sheaths fibrillose.
Perigynia elliptic, tapering about equally to base and apex.
Pistillate spikes dense, mostly full at base; scales blunt, slightly if at all exceeding the perigynia.
Pistillate spikes 2–7 cm. long . . . . . 71. *C. stricta*.
Pistillate spikes 0.5–1.5 cm. long . . . . (71) *C. stricta*, v. *curtissima*.
Pistillate spikes rather loose, long-attenuate at base; scales acutish . . . . . (71) *C. stricta*, v. *angustata*.
Perigynia obovate or orbicular, shorter than the attenuate scales . . . . . (71) *C. stricta*, v. *decora*.
E. Perigynia plump, subterete.
Mature perigynia fleshy, pyriform or subglobose, orange or brownish, glabrous . . . . . 72. *C. aurea*.
Mature perigynia not fleshy, ellipsoid, slender-stipitate, white, pulverulent . . . . . 73. *C. bicolor*.
B. Perigynia lustrous.
Perigynia nerved.
Leaves flat; bracts ascending . . . . . 180. *C. Grahami*.
Leaves soon involute; bracts divergent . . . . . 181. *C. rotundata*.
Perigynia nerveless.
Leaves flat; pistillate spikes subglobose or short-cylindric, 5–8 mm. thick . . . . . 179. *C. saxatilis*.
Leaves involute or filiform; pistillate spikes slender, 8–7 mm. thick . . . . . (179) *C. saxatilis*, v. *miliaris*
4. **Achenes trigonous; stigmas 3** (very rarely and exceptionally 2) *K.*
K. Spikes solitary, terminal *L.*
L. Spikes naked or without large leafy bracts *M.*
M. Leaves tongue-shaped, 2–4 cm. broad . . . . . 77. *C. Fraseri*.
M. Leaves grass-like, narrow *N.*
N. Spikes monoecious, green or straw-color; perigynia glabrous *O.*
O. Spikes staminate at tip, few-flowered; perigynia with entire tips.
Perigynia appressed-ascending, in a linear-cylindric spike, beakless.
Perigynia 2.5–3.5 mm. long; achenes lustrous, not puncticulate, obtusely trigonous . . . . 75. *C. leptalea*.
Perigynia 4–5 mm. long; achenes puncticulate, barely lustrous, sharply trigonous . . . . . 76. *C. Harperi*.
Perigynia soon refracted, slender-beaked . . . 74. *C. pauciflora*.
O. Spikes staminate at base, many-flowered; perigynia with long bidentate beaks.
Scales of pistillate flowers subulate-tipped . . . 161. *C. squarrosa*.
Scales blunt . . . . . 162. *C. typhinoides*.
N. Spikes dioecious, purplish-brown; perigynia pubescent.
Culms shorter than the leaves; scales short-aristate, exceeding the perigynia . . . . . 116. *C. picta*.
Culms exceeding the leaves; scales blunt, shorter than the perigynia . . . . . 92. *C. scirpoidea*.
L. Spikes subtended by long leafy bracts.
Perigynia somewhat 2-edged.
Scales all bracteate, overtopping the perigynia . . . 89. *C. Backii*.
Only the lowest scales overtopping the perigynia . . 90. *C. Willdenowii*.
Perigynia globose, with slender cylindric beak . . . 91. *C. Jamesii*.
K. Spikes 2 or more *P.*
P. *Perigynia not rigidly bidentate, the orifice entire or emarginate, the teeth if present soft and thin* *Q.*
Q. Terminal spike bearing some pistillate flowers *R.*
R. Terminal spike pistillate throughout, brown or purplish, the lower spike much smaller; perigynia hairy . . . 92. *C. scirpoidea*.
R. Terminal spike with both staminate and pistillate flowers *S.*
S. Terminal spike pistillate only at base; the capillary peduncles often basal; perigynia sharply angled . . . 118. *C. pedunculata*.
S. Terminal spike pistillate at summit, or, if pistillate at base, the spikes mostly near the tip of the culm *T.*
T. Perigynia ascending *U.*
U. Scales brown to purplish-black; spikes globose, ovoid or thick-cylindric *V.*

V. Scales shorter than or about equaling the perigynia.
Scales rough-awned; coarse southern plant . . . 148. *C. verrucosa.*
Scales blunt; slender northern plants.
Spikes sessile, closely approximate in an irregular head 78. *C. Halleri.*
Spikes mostly peduncled, spreading or drooping . . 79. *C. atrata*, v. *ovata.*
V. Scales much exceeding the perigynia.
Spikes sessile, erect . . . . . 80. *C. polygama.*
Spikes peduncled, spreading or drooping . . . 111. *C. paupercula.*
U. Scales white or greenish, or if very brownish the spikes linear-cylindric *W.*
W. Spikes mostly sessile or subsessile and erect *X.*
X. Spikes mostly remote; leaves glabrous, short and broad (4–10 mm. broad) . . . . . 135. *C. granularis.*
X. Spikes approximate or overlapping; leaves long and slender (1–4 mm. broad), at least the sheaths hairy.
Perigynia smooth, or when young slightly hairy.
Leaves smooth . . . . . (81) *C. triceps*, v. *Smithii.*
Leaves hairy . . . . . 81. *C. triceps*, v. *hirsuta.*
Perigynia very hairy.
Terminal spike (including the staminate base) 1.8–4 cm. long, one tenth to one seventh as thick . 82. *C. virescens.*
Terminal spike 9–18 mm. long, one fifth to one third as thick . . . . . (82) *C. virescens*, v. *Swanii*
W. Spikes mostly peduncled, spreading or drooping *Y.*
Y. Perigynia 2 mm. or more thick.
Scales blunt or cuspidate, much shorter than the perigynia . . . . . 83. *C. formosa.*
Scales long-awned, usually equaling the perigynia . 84. *C. Davisii.*
Y. Perigynia less than 2 mm. thick *Z.*
Z. Bracts with distinct long sheaths; perigynia bluntly angled *a.*
a. Perigynia rounded or narrowed but not definitely stipitate at base *b.*
b. Perigynia less than 4 mm. long, beakless.
Sheaths glabrous; perigynia obtuse . . . 85. *C. gracillima.*
Sheaths pubescent; perigynia acutish . . 86. *C. aestivalis.*
b. Perigynia 4 mm. or more long.
Leaves hairy; perigynia beakless . . . 87. *C. oxylepis.*
Leaves smooth; perigynia beaked.
Scales white or whitish; perigynia with long conic-cylindric beaks . . . . 146. *C. debilis*, vars.
Scales with dark-brown margins; perigynia with short-conic beaks . . . . 147. *C. venusta*, v. *minor*
a. Perigynia with slender stipitate bases . . . 145. *C. arctata.*
Z. Bracts sheathless; perigynia sharply angled . . 115. *C. prasina.*
T. Perigynia wide-spreading or reflexed.
Perigynia orbicular to broadly elliptic, compressed, nerveless, with tiny short point; bracts erect . . . 88. *C. Shortiana.*
Perigynia terete, beaked, strong-ribbed; bracts divergent.
Beak about as long as body of perigynium. . . . 138. *C. flava.*
Beak much shorter than body of perigynium . . . 139. *C. Oederi.*
Q. Terminal spike staminate throughout *c.*
c. Lowest foliaceous bracts of the inflorescence sheathless, or with short colored sheaths or colored auricles, sometimes wanting or reduced to mere colored sheaths *d.*
d. Perigynia pubescent (if rarely glabrous, the spikes mostly crowded at the base of the densely tufted leaves) *e.*
e. Spikes subtended by colored tubular sheaths which are without green blades.
Pistillate spikes cylindric, 1–2 cm. long; scales exceeding the perigynia . . . . . 120. *C. Richardsoni.*
Pistillate spikes subglobose, 4–7 mm. long; scales much shorter than the perigynia . . . . . 119. *C. concinna.*
e. Spikes bractless or the lowermost with green foliaceous bracts *f.*
f. Leaves and culms soft-pubescent . . . . . 101. *C. pubescens.*
f. Leaves and culms glabrous *g.*
g. Leaves mostly basal, the culms naked or with short reduced leaves *h.*
h. Scales rough-cuspidate; perigynia yellowish-brown . 102. *C. caryophyllea.*
h. Scales smooth; perigynia green or whitish *i.*
i. Plant strongly stoloniferous, the elongate often leafless stolons scaly-bracted and creeping.
Beak one fourth to one fifth as long as the body of the perigynium . . . . . 100. *C. pennsylvanica.*
Beak about as long as the body . (100) *C. pennsylvanica*, v. *lucorum*
i. Plant caespitose or slightly stoloniferous, the basal leafy shoots strongly assurgent *j.*
j. Some (or all) of the culms short and more or less hidden by the bases of the leaves *k.*

k. Remnants of the old leaves persisting as stiff tufted shreds; scales acuminate, sharp-pointed, nearly or quite equaling the perigynia.
Perigynia 1.7–2.4 mm. thick.
Beak nearly or quite as long as the body of the perigynium.
Perigynia puberulent . . . . . 93. *C. umbellata.*
Perigynia glabrous . . . . . (93) *C. umbellata*, v. *tonsa*
Beak one third as long as the body (93) *C. umbellata*, v. *brevirostris.*
Perigynia 1.3–1.6 mm. thick . . . . . 94. *C. nigro-marginata.*
k. Remnants of old leaves soft, slightly if at all shredded; scales blunt or acute, much shorter than the perigynia . . . . . 95. *C. deflexa.*
j. Culms elongate, none of them hidden at the base of the plant *l*.
l. Perigynia much exceeding the scales; spikes closely approximate . . . . . 96. *C. albicans.*
l. Perigynia nearly or quite equaled by the scales *m*.
m. Mature leaves 3–5 mm. wide (if exceptionally narrower, the spikes remote) . . . . . 97. *C. communis.*
m. Mature leaves 1–2.5 mm. wide (if exceptionally broader, the spikes approximate).
Staminate and pistillate spikes all sessile.
Scales of pistillate spikes whitish or greenish . 98. *C. varia.*
Scales purplish . . . . . (98) *C. varia*, v. *colorata.*
Staminate and the lowermost pistillate spikes short-peduncled . . . . . 99. *C. novae-angliae.*
g. Culms leafy, the leaves elongate *n*.
n. Pistillate spikes sessile or subsessile; basal sheaths fibrillose.
Staminate spike overtopping the pistillate . . . . 154. *C. vestita.*
Staminate spike shorter than the pistillate . . . (154) *C. vestita*, v. *Kennedyi.*
n. Pistillate spikes (or at least the lower) distinctly peduncled; sheaths not fibrillose.
Leaves soft, ribbon-like, dark green, the lower bract exceeding the culm; perigynia long-beaked . . . 150. *C. scabrata.*
Leaves firm, short, glaucous; the bracts short; perigynia barely beaked . . . . . 103. *C. glauca.*
d. Perigynia glabrous *o*.
o. Leaves setaceous, basal; culms setaceous, naked; bracts reduced to pale tubular sheaths . . . . . 117. *C. eburnea.*
o. Leaves flat or plicate *p*.
p. Leaves lanceolate, 1.5–3 cm. broad, firm and evergreen; culms slender, bearing numerous tubular colored sheaths and remote slender spikes . . . . . 121. *C. plantaginea.*
p. Leaves linear or linear-lanceolate, less than 1.5 cm. broad *q*.
q. Perigynia beakless or with minute entire beaks *r*.
r. Pistillate spikes mostly on capillary peduncles, wide-spreading or drooping *s*.
s. Scales brownish or purplish, nearly equaling or exceeding the compressed short-tipped perigynia *t*.
t. Spikes globose to oblong-cylindric, rarely 2 cm. long; scales exceeding the perigynia *u*.
u. Scales long-attenuate with subulate tips, much exceeding the perigynia.
Scales dark brown or purplish throughout.
Pistillate spikes 4–8 mm. long . . . . . 111. *C. paupercula.*
Pistillate spikes 1–1.6 cm. long . . (111) *C. paupercula*, v. *irrigua.*
Scales green with pale-brown or yellowish margins (111) *C. paupercula*, v. *pallens.*
u. Scales obtuse or acute, barely exceeding the perigynia.
Leaves involute, 0.5–1 mm. wide, glaucous; scales brown. . . . . 112. *C. limosa.*
Leaves flat, 1–3 mm. wide, dark green; scales purple-black . . . . . 113. *C. rariflora.*
t. Spikes linear-cylindric, 2–5 cm. long; scales barely equaling the perigynia . . . . . 114. *C. littoralis.*
s. Scales whitish, much shorter than the sharply trigonous attenuate perigynia . . . . . 115. *C. prasina*
r. Pistillate spikes sessile or short-peduncled, erect *v*.
v. Plant glaucous, loosely stoloniferous; staminate spikes long-stalked, their scales mostly purple-brown.
Leaves 2.5–5 mm. wide, revolute in drying, harsh; culms harsh; perigynia brown . . . . . 103. *C. glauca.*
Leaves 1–3 mm. wide, becoming plicate or involute smooth; culms smooth; perigynia pale green or whitish . . . . . 104. *C. livida.*
v. Plant green, densely tufted; staminate spikes sessile or short-stalked, their scales pale brown or straw color.

Spikes all sessile and approximate; perigynia obovoid, prominently ribbed, retuse, with a distinct short entire beak . . . . . 109. *C. abbreviata*
Lowest spike peduncled; perigynia narrowly obovoid, faintly nerved or nerveless, narrowed to the beakless tip . . . . . 110 *C. pallescens.*
q. Perigynia distinctly beaked *w.*
w. Spikes sessile, or the lowermost short-pedicelled, erect or oblique . the bracts very long and much exceeding the inflorescence, rarely 5 mm. broad.
Leaves involute . . . . . 137. *C. extensa.*
Leaves flat.
Beak about equaling body of perigynium . . . . 138. *C. flava.*
Beak much shorter than body of perigynium . . . 139. *C. Oederi.*
w. Spikes mostly long-pedicelled, spreading or drooping, if sessile and erect the bracts more than 5 mm. wide *x.*
x. Leaves broad (usually 5 mm. or more); scales strong-ribbed; spikes dense, the perigynia firm, dull, wide-spreading *y.*
y. Leaves soft, ribbon-like, dark green; lower bract 5–10 mm. wide, much exceeding the inflorescence . . 150. *C. scabrata.*
y. Leaves firm, glaucous; lower bract 1–4 mm. wide, about equaling the inflorescence.
Perigynia spreading-ascending, glaucous, faintly-nerved or nerveless, gradually tapering to the short beak . 148. *C. verrucosa.*
Perigynia squarrose, deep green or brownish, strongly many-ribbed, abruptly beaked . . . . . 149. *C. macrokolea.*
x. Leaves narrow (usually less than 5 mm. wide); scales thin, nerveless or slightly nerved; spikes loosely flowered, the thin lustrous perigynia strongly ascending *z.*
z. Perigynia abruptly contracted to an awl-shaped beak as long as the body . . . . . 141. *C. longirostris.*
z. Perigynia gradually contracted to the beak.
Leaves pubescent; pistillate spikes 5–8 mm. thick . 143. *C. castanea.*
Leaves glabrous; pistillate spikes 2–4 mm. thick . . 144. *C. capillaris.*
o. Lowest foliaceous bract of the inflorescence with a prominent closed green sheath *a.*
a. Perigynia nerveless or with few nerves most prominent toward the base, not uniformly and conspicuously nerved from base to orifice (excepting the marginal nerves) *b.*
b. Plant caespitose, scarcely stoloniferous, the rootstock short and thick; perigynia with long-attenuate beaks *c.*
c. Perigynia abruptly contracted to a slender beak as long as the body.
Perigynia hairy, remote . . . . . 140. *C. assiniboinensis.*
Perigynia smooth, approximate . . . . . 141. *C. longirostris.*
c. Perigynia gradually contracted to the beak *d.*
d. Pistillate spikes oblong-cylindric, densely flowered.
Spikes 5–10 mm. thick.
Leaves glabrous; scales white . . . . . 142. *C. cherokeensis.*
Leaves pubescent; scales brown . . . . . 143. *C. castanea.*
Spikes 2–4 mm. thick.
Plant 0.5–1.5 dm. high; spikes approximate . . . 144. *C. capillaris.*
Plant taller; spikes remote . . . . (144) *C. capillaris*, v. *elongata.*
d. Pistillate spikes linear-cylindric *e.*
e. Basal sheaths reddish-purple or castaneous *f.*
f. Basal leaves 6–10 mm. broad, scabrous at base; perigynia stipitate, ovoid-trigonous . . . . . 145. *C. arctata.*
f. Basal leaves 3–7 mm. broad, smooth at base; perigynia fusiform, obscurely trigonous . .
Perigynia glabrous.
Perigynia mostly overlapping.
Perigynia 6–9 mm. long, twice as long as the white scales . . . . . 146. *C. debilis.*
Perigynia 4.5–6.5 mm. long; the scales straw-color or greenish-brown.
Perigynia twice as long as the scales; leaves 2–4 mm. wide . . . . . (146) *C. debilis*, v. *Rudgei.*
Perigynia one third longer than the scales; leaves 4–6 mm. wide . . . . . (146) *C. debilis*, v. *strictior.*
Perigynia alternate and mostly remote, not overlapping . . . . . (146) *C. debilis*, v. *interjecta.*
Perigynia hairy . . . . . (146) *C. debilis*, v. *pubera.*
e. Basal sheaths dull pale brown . . . . (127) *C. laxiflora*, v. *leptonervia*
b. Plant loosely stoloniferous, the elongate rootstock slender; perigynia beakless or with short or abrupt beak *g.*
g. Perigynia hairy . . . . . 102. *C. caryophyllea.*
g. Perigynia not hairy *h.*
h. Perigynia beakless or with a very short oblique tip *i.*

i. Perigynia granulose-roughened; spikes very remote, sessile or short-stalked, in nearly all the leaf-axils . . 136. *C. Crawei.*
i. Perigynia not granulose; spikes (except in rare cases long-stalked basal ones) borne only toward the summit of the culm *j.*
j. Leaves white-glaucous, quickly becoming plicate or involute . . . . . 104. *C. livida.*
j. Leaves green, slightly if at all glaucous, flat, in age becoming revolute.
Culms obtusely angled, smooth throughout . . 105. *C. panicea.*
Culms acutely angled, scabrous at summit.
Spikes slender-cylindric, 3.6 mm. thick.
Spikes mostly close-flowered, the perigynia overlapping . . . . . 106. *C. tetanica.*
Spikes loosely flowered, most of the perigynia remote . . . . . (106) *C. tetanica*, v. *Woodii.*
Spikes oblong-cylindric, 6–10 mm. thick . . (106) *C. tetanica*, v. *Meadii.*
h. Perigynia with a straightish slender beak.
Culm stiff, harsh above; spikes stiffly erect, densely many-flowered . . . . . 107. *C. polymorpha.*
Culm flexuous, smooth throughout; spikes spreading or drooping, loosely few-flowered . . . . . 108. *C. vaginata.*
a. Perigynia with numerous uniform nerves from base to orifice (extreme specimens of nos. 106, 107, 108 might be sought here) *k.*
k. Tall and slender, with linear-cylindric spikes . . . . 147. *C. venusta*, v. *minor*
k. Low, or if tall with thick-cylindric to globose spikes *l.*
l. Perigynia sharply angled, with plane faces (forms of *C. laxiflora* might be sought here) *m.*
m. Perigynia 5–7 mm. long; staminate spikes dark brown or purplish . . . . . 122. *C. Careyana.*
m. Perigynia 2–4 mm. long; staminate spike straw-color or pale brown *n.*
n. Basal leaves 1–3 cm. broad; pistillate spikes sessile and erect . . . . . 123. *C. platyphylla.*
n. Basal leaves narrower, or, if rarely 1 cm. broad, the spikes flexuous on capillary peduncles.
Scales acuminate or aristate; lowest bract slightly if at all overtopping the inflorescence.
Basal leaves 6–12 mm. broad.
Perigynia 2.8–3.2 mm. long . . . . . 124. *C. laxiculmis.*
Perigynia 3.3–4 mm. long . . . . (124) *C. laxiculmis*, v. *copulata*
Basal leaves 2–5 mm. broad . . . . . 125. *C. digitalis.*
Scales blunt; lowest bract greatly overtopping the inflorescence . . . . . 126. *C. ptychocarpa.*
l. Perigynia obtusely angled, or plump and scarcely if at all angled *o.*
o. Perigynia strongly ascending, beakless or with broadly conic oblique tips; spikes mostly scattered; bracts strongly ascending *p.*
p. Perigynia fusiform to fusiform-obovoid, tapering subequally to the conic tip and the long gradually contracted base, obtusely trigonous *q.*
q. Perigynia bearing distinct elevated ribs; scales smooth *r.*
r. Perigynia with several ribs on each face *s.*
s. Staminate spike prominent, usually projecting above the pistillate; culms slightly if at all ancipital *t.*
t. Pistillate spikes distinct, not closely crowded.
Perigynia plump-obovoid, the short beak abruptly bent to one side.
Pistillate spikes mostly 1.5–3 cm. long . . 127. *C. laxiflora.*
Pistillate spikes mostly 0.5–1.3 cm. long (127) *C. laxiflora*, v. *gracillima.*
Perigynia ellipsoid-fusiform, the elongate beak slightly oblique.
Perigynia appressed-ascending in an alternate-flowered spike . . . (127) *C. laxiflora*, v. *patulifolia.*
Perigynia oblique or divergent, mostly overlapping in the densish spike.
Basal leaves 7–12 mm. broad . (127) *C. laxiflora*, v. *Michauxii.*
Basal leaves 3–6 mm. wide . . (127) *C. laxiflora*, v. *styloflexa.*
t. Uppermost pistillate spikes approximate at the base of the staminate . . . . (127) *C. laxiflora*, v. *varians.*
s. Staminate spike small and nearly or quite hidden among the pistillate; culms ancipital.
Basal leaves elongate, linear-lanceolate, 5–14 mm. broad . . . . . (127) *C. laxiflora*, v. *blanda.*
Basal leaves lanceolate, 1.5–4 cm. broad . (127) *C. laxiflora*, v. *latifolia.*
r. Perigynia nerveless or with 1–3 nerves on each face (127) *C. laxiflora*, v. *leptonervia*

q. Perigynia closely impressed-nerved; scales rough-awned.
Sheaths pubescent . . . . . 128. *C. Hitchcockiana.*
Sheaths glabrous . . . . . 129. *C. oligocarpa.*
p. Perigynia oblong-ovoid to obovoid or globose, rounded to the sessile or abruptly short-stipitate base *u*.
u. Closely caespitose, not stoloniferous *v*.
v. Culms 1–6 cm. high, more than twice exceeded by the leaves and bracts . . . . . 130. *C. katahdinensis.*
v. Culms taller; bracts proportionately shorter *w*.
w. Uppermost bract slightly if at all overtopping the staminate spike; perigynia impressed-nerved 131. *C. conoidea.*
w. Uppermost bract much overtopping the staminate spike (if rarely shorter, the perigynia with prominent ribs) *x*.
x. Perigynia impressed-nerved *y*.
y. Style jointed below the middle.
Leaves thin and soft, slightly if at all glaucous.
Spikes borne principally in the upper axils.
Perigynia oblong.
Perigynia turgid, beakless, scarcely angled . . . . . 132. *C. grisea.*
Perigynia scarcely turgid, trigonous, narrowed to a beak . . (132) *C. grisea*, v. *rigida.*
Perigynia subglobose . . . . (132) *C. grisea*, v. *globosa.*
Spikes borne from the lowest as well as the upper axils . . . . . (132) *C. grisea*, v. *angustifolia.*
Leaves thick and firm, very glaucous . . 133. *C. glaucodea.*
y. Style jointless; perigynia golden-brown . . 134. *C. flaccosperma.*
x. Perigynia with elevated ribs and short point or beak.
Perigynia plump-ovoid to globose . . . 135. *C. granularis.*
Perigynia oblong . . . . . (135) *C. granularis*, v. *Haleana.*
u. Culms solitary, from slender stoloniferous base . . 136. *C. Crawei.*
o. Perigynia wide-spreading or squarrose, slender-beaked; spikes mostly toward the summit of the culm; bracts divergent *z*.
z. Leaves involute; perigynia spreading-ascending . . 137. *C. extensa.*
z. Leaves flat; perigynia squarrose *aa*.
aa. Beak about as long as the body of the perigynium, often bent, at least in maturity.
Staminate spike sessile or very short-stalked, sometimes pistillate at tip; pistillate spikes mostly contiguous.
Fruiting spikes 9–12 mm. thick, short-cylindric or globose; beaks spreading in all directions . 138. *C. flava.*
Fruiting spikes 6.5–8 mm. thick, mostly short-cylindric perigynia mostly wide-spreading and straightish . . . . . (138) *C. flava*, v. *rectirostra.*
Staminate spike usually peduncled; pistillate mostly remote, the curved perigynia usually retrorse . (138) *C. flava*, v. *elatior.*
aa. Beak distinctly shorter than body of the perigynium, straight or slightly bent, ascending or horizontally spreading.
Staminate spike usually peduncled; pistillate scattered . . . . . 139. *C. Oederi.*
Staminate spike usually sessile, often more or less pistillate; pistillate spikes mostly approximate (139) *C. Oederi*, v. *pumila.*
P. Beak or tip of perigynium sharply bidentate, the teeth acerose bb.
bb. Perigynia firm and tough, closely investing the achene *cc*.
cc. Teeth less than 1 mm. long, erect *dd*.
dd. Perigynia pubescent.
Leaves involute-filiform . . . . . 151. *C. filiformis.*
Leaves broad and flat.
Scales mostly equaling the densely hairy perigynia . . 152. *C. lanuginosa.*
Scales mostly shorter than the sparsely hairy perigynia 153. *C. Houghtonii.*
dd. Perigynia glabrous.
Perigynia broadly ovoid . . . . . 155. *C. striata*, v. *brevis*
Perigynia narrowly ovoid.
Perigynia more than 5 mm. long, becoming lustrous. . 159. *C. riparia.*
Perigynia less than 5 mm. long, dull and minutely papillose 160. *C. acutiformis.*
cc. Teeth more than 1 mm. long, divergent or recurved *ee*.
ee. Scales of staminate spike hairy . . . . . 157. *C. hirta.*
ee. Scales of staminate spike glabrous.
Perigynia hairy.
Perigynia ovoid, in slender cylindric spikes . . . 158. *C. trichocarpa.*
Perigynia lance-subulate, in short-cylindric or ovoid spikes . . . . . (158) *C. trichocarpa*, v. *turbinata.*
Perigynia glabrous.

Perigynia obscurely ribbed . . . . . (158) *C. trichocarpa*, v. *Deweyi*.
Perigynia prominently ribbed.
Sheaths hairy . . . . . (158) *C. trichocarpa*, v. *aristata*
Sheaths glabrous . . . . . (158) *C. trichocarpa*, v. *imberbis*
bb. Perigynia thin and papery, usually more or less inflated *ff*.
ff. Staminate spike solitary or none or the terminal only partly staminate (rarely a very short secondary spike at the base of the other) *gg*.
gg. Leaves involute-filiform; perigynia broadly conic-ovoid, 5-6 mm. long . . . . . 156. *C. oligosperma*.
gg. Leaves flat *hh*.
hh. Perigynia obconic or broadly obovoid, truncate or abruptly rounded above to long subulate beaks; terminal spike often mostly pistillate.
Perigynia longer than the scales.
Pistillate scales subulate-tipped or awned . . . . 161. *C. squarrosa*.
Pistillate scales blunt . . . . . 162. *C. typhinoides*.
Perigynia shorter than the rough-awned scales . . . . 163. *C. Frankii*.
hh. Perigynia from subulate to ovoid or globose, if abruptly beaked the terminal spike staminate *ii*.
ii. Pistillate spikes oblong-cylindric or narrower *jj*.
jj. Perigynia scarcely inflated, rigid, lance-subulate, slender-stipitate, with prominent rigid crowded ribs, soon retrorse.
Teeth of the perigynia nearly parallel . . . . . 164. *C. Pseudo-Cyperus*.
Teeth of the perigynia strongly divergent . . . . 165. *C. comosa*.
jj. Perigynia inflated, if stipitate large and bladder-like *kk*.
kk. Mature perigynia less than 12 mm. long *ll*.
ll. Pistillate scales mostly with thin serrulate awns; perigynia not falcate *mm*.
mm. Staminate scales with rough awns; plants caespitose.
Perigynia slightly inflated, narrowly conic; achenes obovoid . . . . . 166. *C. hystericina*.
Perigynia with bladdery-inflated subglobose bodies and abrupt beaks; achenes narrowly ellipsoid-ovoid.
Pistillate spikes 1.5-2 cm. thick; perigynia 7-10 mm. long . . . . . 167. *C. lurida*.
Pistillate spikes 1-1.3 cm. thick; perigynia 5-7 mm. long . . . . . (167) *C. lurida*, v. *gracilis*.
mm. Staminate scales smooth, scarcely if at all awned; plant loosely stoloniferous . . . . . 168. *C. Schweinitzii*.
ll. Pistillate scales smooth, or only the lowest serrulate *nn*.
nn. Plant caespitose, forming tussocks; perigynia somewhat falcate.
Spikes mostly clustered and sessile at the tip of the culms; perigynia retrorse.
Perigynia 8-10 mm. long . . . . . 169. *C. retrorsa*.
Perigynia 5-6 mm. long . . . (169) *C. retrorsa*, v. *Robinsonii*.
Spikes scattered, mostly long-peduncled.
Perigynia wide-spreading or retrorse . (169) *C. retrorsa*, v. *Hartii*.
Perigynia ascending . . . (169) *C. retrorsa*, v. *Macounii*.
nn. Plant not caespitose, the culms solitary from slender rootstocks; perigynia not falcate . . 170. *C. Halei*.
kk. Mature perigynia more than 12 mm. long.
Achene rhomboid-ovoid, the angles prominently nipple-tipped . . . . . 172. *C. lupuliformis*.
Achene narrowly ellipsoid-ovoid, the angles scarcely nipple-tipped.
Pistillate spikes mostly crowded, sessile or subsessile . . . . . 173. *C. lupulina*.
Pistillate spikes mostly peduncled, the lowermost remote . . . . . (173) *C. lupulina*, v. *pedunculata*
ii. Pistillate spikes globose or subglobose *oo*.
oo. Staminate scales prolonged into rough thin awns . 167. *C. lurida*.
oo. Staminate scales smooth *pp*.
pp. Teeth of the beak erect or ascending *qq*.
qq. Mature perigynia green.
Perigynia elongate-rhomboid, cuneate at base.
Perigynia glabrous . . . . . 174. *C. Grayi*.
Perigynia hispidulous . . . . . (174) *C. Grayi*, v. *hispidula*.
Perigynia ovoid to narrowly conic, rounded at base.
Perigynia ovoid-conic, half as broad as long . 175. *C. intumescens*.
Perigynia lance-conic, one fourth to one third as broad as long . . . (175) *C. intumescens*, v. *Fernaldii*.
qq. Mature perigynia straw-colored

Leaves 0.5–1.5 cm. broad . . . . . 176. *C. folliculata.*
Leaves 1.5–3.5 mm. broad . . . . . 177. *C. Michauxiana.*
pp. Teeth of the beak strongly refracted . . . . 178. *C. subulata.*
ff. Staminate spikes 2 or more *rr.*
rr. Achene distinctly broader than long, its faces strongly concaved . . . . . 171. *C. gigantea.*
rr. Achene longer than broad, the faces flat or slightly convex *ss.*
ss. Culm thick and spongy at base, generally smooth and slightly angled above; leaves prominently nodulose.
Perigynia flask-shaped, rather abruptly contracted to the beak, 3–6 mm. long.
Stout; spikes cylindric, 2–10 cm. long . . . . 183. *C. rostrata.*
Slender; spikes globose or short-cylindric, 1–2.5 cm. long . . . . . (183) *C. rostrata*, v. *ambigens.*
Perigynia tapering gradually to the beak, 0.5–1 cm. long . . . . . (183) *C. rostrata*, v. *utriculata.*
ss. Culm scarcely spongy at base, sharp-angled above, often harsh; leaves slightly if at all nodulose *tt.*
tt. Beak of the perigynia usually slightly roughened or serrulate.
Pistillate spikes cylindric, 2.5–5 cm. long, 1–1.5 cm. thick 184. *C. bullata.*
Pistillate spikes globose to thick-cylindric, 1–4 cm. long, 1.5–2 cm. thick . . . . . (184) *C. bullata*, v. *Greenii.*
tt. Beak of perigynia smooth *uu.*
uu. Mature perigynia 5–6.5 mm. thick . . . . . 185. *C. Tuckermani.*
uu. Mature perigynia not more than 4 mm. thick *vv.*
vv. Perigynia ascending, straight; leaves firm, 2–7 mm. wide.
Perigynia bladdery inflated.
Perigynia ovoid-conic, tapering gradually to the beak . . . . . 182. *C. vesicaria.*
Perigynia rounded-ovoid, rather abruptly tapering to the beak.
Perigynia 6 mm. long.
Spikes cylindric, 2–7 cm. long . . . (182) *C. vesicaria*, v. *monile.*
Spikes globose to short-cylindric, 1–2.5 cm. long . . . . . (182) *C. vesicaria*, v. *distenta.*
Perigynia 4–5 mm. long . . . . (182) *C. vesicaria*, v. *jejuna.*
Perigynia barely inflated, conic-subulate . (182) *C. vesicaria*, v. *Raeana.*
vv. Perigynia retrorse or wide-spreading, slightly falcate; leaves soft and ribbon-like, 0.5–1 cm. wide . . 169. *C. retrorsa.*

1. C. muskinguménsis Schwein. Culms 1 m. or less high, very leafy; *leaves subcordate* at their junction with the loose green sheaths, those of the sterile shoots crowded and almost distichous; inflorescence oblong, of 5–12 appressed-ascending *pointed spikes;* perigynia very thin and scale-like, barely distended over the achenes. — Meadows, swamps, and wet woods, O. to Man. and Mo. July, Aug. Fig. 340.

341. C. scoparia.

340. C. muskingumensis.

2. C. scopària Schkuhr. Culms 0.2–1 m. high, mostly slender and erect; *leaves narrow (at most 3 mm. wide)*, shorter than the culm; inflorescence of 3–9 *straw-colored or brownish mostly shining* and ascending approximate ovoid *pointed spikes* (0.5–1.5 cm. long); *perigynia* 5(*rarely* 4)–6.5 *mm. long.* — Low ground or even dry open soil, rarely in woods, Nfd. to Sask. and Ore., and southw. May–Aug. Fig. 341. Var. monilifórmis Tuckerm. *Spikes scattered*, the lowest remote. — Less common. Var. condénsa Fernald. *Spikes spreading, crowded* in a globose or subglobose head. — N. B. to Ont. and Ct. Fig. 342.

342. C. scoparia, v. condensa.

3. C. tribuloìdes Wahlenb. Culms loose, 0.3–1 m. high, sharply trigonous; *leaves soft and loose*, 3–8 *mm. broad*, numerous, the upper often nearly or quite overtopping the culm, those of the sterile shoots crowded and somewhat distichous; *inflo-*

rescence compact, the 8–14 *obovoid ascending* somewhat crowded *gray-green or dull-brown spikes* 7–12 mm. long; *perigynia* 3.7–5 *mm. long, their tips appressed.* — Swales and rich open woods, N. B. to Sask., and southw. June–Sept. FIG. 343. Var. TURBÀTA Bailey. Spikes remote. — Less common.

343. C. tribuloides.

Var. **redúcta** Bailey. Inflorescence usually flexuous, at least the lowest spikes scattered; *perigynia with loosely recurved tips.* (Var. *moniliformis* Britton, in part.) — Gulf of St. Lawrence to Ont., s. to Ct., N. Y., and Ia. FIG. 344.

344. C. trib., v. reducta.

4. **C. siccàta** Dewey. Culms slender, 1–6 dm. high; *leaves stiff,* 1–3 mm. wide; inflorescence of 3–7 approximate or scattered *glossy brown spikes,* the *staminate and pistillate flowers variously mixed or in distinct spikes;* perigynia obviously distended over the achene, 2 mm. broad, usually with distinct serrulate wings. — Dry or sandy soil, Me. to B. C. and Alaska, s. to Mass., Ct., N. Y., O., Mich., and westw. May–July. FIG. 345.

345. C. siccata.

5. **C. Crawfórdii** Fernald. *Slender,* the *culms forming close stools;* leaves narrow (1–2.5 mm. wide), often equaling or exceeding the culms; *inflorescence dull brown,* subcylindric or ovoid, often subtended by an elongate filiform bract; *spikes* 3–12, *subcylindric or narrowly ovoid,* ascending, 3–7 *mm. long,* approximate; the *linear-lanceolate perigynia plump at base, about* 1 *mm. wide.* (*C. scoparia,* var. *minor* Boott.) — Open soil, rarely in woods, Nfd. to B. C., s. to n. Ct., and Mich. June–Sept. FIG. 346. Var. VIGENS Fernald. Stouter throughout; culms 3–6 dm. high; leaves 2.5–3 mm. broad; spikes mostly greener and longer, densely crowded. — Less common. FIG. 347.

346. C. Crawfordii.

347. C. Crawfordii, v. vigens.

6. **C. oronénsis** Fernald. *Culms few in loose stools, tall* and erect, 0.5–1 *m. high,* sharply angled and *harsh above;* leaves smooth, 2.5–4 mm. broad, much shorter than the culms; *inflorescence thick-cylindric,* erect; *spikes* 3–9, ascending, *dark brown, rhomboid-ovoid, pointed,* 0.5–1 cm. long; *scales dark, with pale scarious margins;* perigynia appressed, about 4 mm. long, 1.3 mm. broad, very narrowly winged above. — Dry fields, thickets, open woods, and gravelly banks, Orono and Bangor, Me. June–July. FIG. 348.

348. C. oronensis.

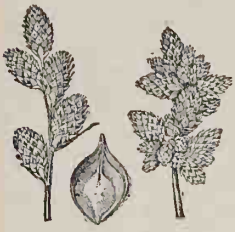
349. C. pratensis.

7. **C. praténsis** Drejer. *Culms smooth and slender,* 3–6 dm. high, overtopping the smooth flat (2–3.5 mm. broad) leaves; *inflorescence* slender, *flexuous, moniliform; spikes* 3–7, *silvery-brown,* mostly remote, pointed, *few-flowered,* 7–1.7 mm. long, mostly *long-clavate at base; perigynia ovate-lanceolate,* 4.5–6.5 mm. long, 1.5–2 mm. broad. — Open woods, clearings, and prairies, Lab. to B. C., s. to N. S., n. Me., L. Superior, etc. June–Aug. (Greenl.) FIG. 349.

8. **C. cristàta** Schwein. *Culms* 1 m. or less high, *harsh above; leaves soft and flat,* 3–7 *mm. broad,* often equaling

the culms, *sheaths loose; inflorescence* usually *dense, cylindric to ellipsoid; spikes* 6–15, *globose,* closely flowered, *greenish or dull brown,* 0.5–1 cm. long; *perigynia* 3–4 mm. long, their *tips rosulate-spreading.* (*C. tribuloides*, var. Bailey; *C. cristatella* Britton.) — Swales and wet woods, e. Mass. and Vt. to Pa., Mo., Sask., and B. C. June–Aug. Fig. 350.

350. C. cristata.


351. C. albolutescens.

9. **C. albolutéscens** Schwein. *Culms* stout and *stiff,* 2–8 dm. high; *leaves erect,* long-pointed, *pale green,* 2–5 mm. wide, shorter than the culms; inflorescence stiff, linear-cylindric to subglobose, with or without elongated bracts; spikes 3–30 (sometimes compound), conic-ovoid to subglobose, 0.6–1 cm. long; perigynia 2–3 mm. broad, rhombic-ovate to suborbicular, pale, with short deltoid firm greenish tips. (*C. straminea*, vars. *foenea* Torr. and *cumulata* Bailey.) — Damp or even dry soil, chiefly on the coastal plain, N. B. to Fla. and Mex., rarely inland; also L. Huron to Man. July–Sept. Fig. 351.

352. C. mirabilis.

10. **C. mirábilis** Dewey. *Culms* 0.3–1.5 m. high, *very loose and smooth; leaves soft* and thin, 2.5–6 *mm. wide,* the sheaths rather loose; *spikes* 4–12, greenish, subglobose or ovoid, 5–9 mm. long, *mostly approximate;* perigynia lance-ovate, 3–4 mm. long, with divergent tips. (*C. straminea*, var. Tuckerm.) — Dry banks, open woods, and rich copses, Me. to Man., N. C. and Mo. June, July. Fig. 352. Var. perlónga Fernald. *Spikes remote.* — Less common. Fig. 353.

353. C. mir., v. perl.

Var. tíncta Fernald. *Spikes* 3–7, ovoid, approximate, *brown-tinged; scales brown with a pale margin.* — N. B. and n. N. E. — Plant comparatively small.

354. C. straminea.

11. **C. stramínea** Willd. *Culms very slender,* 3–7 dm. high, smooth except at summit; *leaves* 0.5–2 *mm. wide; spikes* 3–8, *yellow-brown,* or rarely green ovoid or subglobose, 4–8 *mm. long,* usually forming a moniliform or linear-cylindric *flexuous inflorescence; perigynia rarely* 4 *mm. long,* lance-ovate, the inner faces 3–5-nerved or nerveless, *the ascending tips inconspicuous.* (*C. tenera* Dewey.) — Meadows, dry banks, or open woods, N. B. to B. C., Ky., and Ark. June–Aug. Fig. 354.

355. C. str., v. echin.

Var. echinòdes Fernald. *Tips of the slightly longer perigynia divergent and conspicuous.* — Vt. (*Brainerd*); Ont. and Mich. to Ia. Fig. 355.

12. **C. hormathòdes** Fernald. Culms slender and flexuous, sharply angled, smooth except at summit, 3–9 dm. high; leaves shorter than or rarely exceeding the culms, very ascending, 1–2.5 mm. wide; *inflorescence* slender, *moniliform* (or on late culms congested), of 3–9 *broadly ovoid brownish spikes* (8–12 *mm. long*), with or without subtending elongated bracts; *perigynia*

356. C. hormathodes.

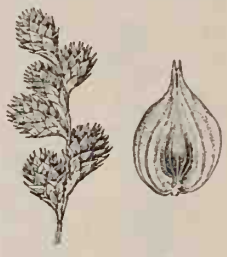
357. C. horm., v. invisa.

elongate-ovate, ascending or rarely spreading, distinctly about 10-*nerved on each face;* scales lance-attentuate or aristate. (*C. straminea*, var. *aperta* Boott; *C. tenera* Britton, not Dewey.) — Fresh or brackish marshes, commonest near the coast, e. Que. to Del. and Ia.; B. C. June–Aug. Fig. 356. — Lower small-spiked (5–8 mm. long) plants have been separated as var. INVÌSA (W. Boott) Fernald. Fig. 357.

Var. Ríchii Fernald. *Perigynia* 4–5 mm. long, *with suborbicular bodies abruptly contracted to conspicuous loosely ascending or spreading tips.* (*C. tenera*, var. Fernald.) — Mass. to D. C. Fig. 358.

358. C. horm., v. Richii. Terminal spike and perigynium.

13. **C. Bicknéllii** Britton. Culms comparatively stout, 4–9 dm. high, smooth except at summit; leaves ascending, rather short and firm, 2–4.5 mm. broad; *inflorescence of* 3–7 *silvery-brown or greenish* ovoid, obovoid or subglobose *approximate or slightly remote spikes* (8–14 *mm. long*); *perigynia ascending, with broadly ovate or suborbicular bodies, the tips becoming conspicuous, broadly wing-margined,* when mature becoming *almost translucent* and *about* 10-*nerved on each face.* (*C. straminea*, var. *Crawei* Boott.) — Dry or rocky soil, Me. to Man., N. J., O., and Ark. — May–July. Fig. 359.



359. C. Bicknellii.

14. **C. silícea** Olney. *Culms* slender, *stiff*, 3–8 dm. high; *leaves erectish, usually glaucous*, 2–4.5 mm. wide, often becoming involute; inflorescence of 3–12 usually *remote* conic-ovoid and *clavate-based whitish spikes* (1–1.5 cm. long); *perigynia firm and opaque*, 4–5 mm. long, 2.2–3 mm. broad, *short-beaked, broad-winged*, the body distinctly 3–5-*nerved on the inner*, 6–12-*nerved on the outer face.* (*C. foenea*, var. *subulonum* Gray.) — Sands and rocks near the sea, Gulf of St. Lawrence to N. J. June–Aug. Fig. 360.

360. C. silicea.

15. **C. alàta** Torr. Culms rather stout, smooth except at summit, 0.5–1 m. high; *leaves* mostly short and *harsh*, 2.5–4.5 mm. wide, the *sheath green and strongly nerved* nearly or quite to the narrow *subchartaceous auricle; head oblong or ovoid*, of 3–8 compact approximate *conic-ovoid or subcylindric spikes* (8–15 *mm. long*); *perigynia appressed-ascending*, firm and opaque, broad-winged, *very faintly nerved or nerveless*, much broader than the usually *rough-awned scales.* (*C. straminea*, var. Bailey.) — Marshes and wet woods, N. H. to Mich. and Fla.; mostly coastal. June, July. Fig. 361.

361. C. alata.

16. **C. suberécta** (Olney) Britton. Similar; slender; *the* 3–5 *irregularly clustered spikes finally tawny or ferruginous; perigynia ovate*, 4–5 mm. long, 2.3–2.8 mm. broad; *scales* lance-ovate, *mostly awnless.* (*C. tenera*, var. Olney; *C. alata*, var. *ferruginea* Fernald.) — Ont. and O. to Mich., Ill., and Ia. Fig. 362.

362. C. suberecta.

17. **C. festucàcea** Schkuhr. *Culms stiff*, 0.5–1 m. high;

leaves stiff, erect, shorter than the culms, 2–4 mm. wide, the *sheath with a thin barely nerved or nerveless pale band* extending down from the *membranous auricle; inflorescence* cylindric, rarely ovoid, *of* 5–10 *distinct or rarely approximate subglobose or broadly ovoid-conic yellow-brown or green-brown ascending spikes* (7–12 mm. long); *perigynia broad-ovate to suborbicular, strongly* 7–15-*nerved on the outer, nerveless or faintly nerved on the inner face; achenes suborbicular.* (*C. straminea*, var. Tuckerm.) — Dry or rocky soil, Me. to Man. and Pa. June–Aug. Fig. 363.

363. C. festucacea.

Var. **brèvior** (Dewey) Fernald. *Lower*, rarely more than 0.6 m. high, and *more slender; spikes* 3–6, *approximate or subapproximate.* (*C. straminea*, var. Dewey.) — Commoner, reaching B. C., Ark., etc. May–July. Fig. 364.

364. C. fest., v. brevior.

18. **C. Bébbii** Olney. Culms rather slender, 2–6 dm. high, smooth except at tip; *leaves* mostly shorter, *ascending but not stiff*, 1.7–4.5 mm. wide; *inflorescence short, compact, ovoid to ellipsoid, brown*, 1–2 *cm. long*, of 3–12 globose or ellipsoid ascending spikes (5–8 mm. long); *perigynia* narrowly ovate, 3–3.5 *mm. long*, 1.5–2 *mm. broad*, mostly *dull brown*, and loosely ascending, *faintly few-nerved or nerveless;* scales oblong, bluntly acuminate. (*C. tribuloides*, var. Bailey.) — Low grounds, Nfd. to w. Mass., N. Y., Ill., Col., B. C., and northw. June–Aug. Fig. 365.

365. C. Bebbii.

19. **C. foènea** Willd. Culms *slender and lax*, smooth except at tip, 3–9 dm. high; *leaves soft and loose*, pale green or glaucous, mostly shorter, 2–4 mm. broad; *inflorescence linear-cylindric* or *moniliform, erect or flexuous, of* 4–9 globose or ovoid clavate-based appressed-ascending *whitish-green or silvery-brown spikes* (6–10 *mm. long*); *perigynia* ovate, 3–4 *mm. long*, 1.8–2.2 mm. broad, appressed-ascending, finally a little spreading. — Dry woods and banks, Me. to B. C. and Md. July. Fig. 366. Var. perpléxa Bailey. *Coarser*, and often taller; *inflorescence heavier*, mostly *nodding*, the 6–15 *spikes larger* (1–1.7 *cm. long*), the terminal ones often crowded; *perigynia* 3.5–4.4 *mm. long.* — Commoner, Nfd. to Man. and Va. June–Aug. Fig. 367.

366. C. foenea.

367. C. foenea, v. perplexa.

20. **C.** leporìna L. *Culms stiff* and ascending, 2–8 dm. high; leaves mostly short and firm, 1.5–4 mm. broad; *inflorescence* from subglobose to cylindric, *of* 3–6 *obovoid or ellipsoid approximate or subapproximate brown or ferruginous ascending spikes* (0.8–1.4 cm. long); *perigynia* 3.8–4.5 mm. long, 1.8–2.3 mm. broad, *ascending.* — Dry hillsides, rocky banks, etc., local, Nfd. to Mass. and N. Y.; and occasional on ballast southw. June–Aug. (Nat. from Eu.) Fig. 368.

368. C. leporina.

21. **C. xeràntica** Bailey. *Culms stiff*, scabrous above, 3–6 dm. high; *leaves short*, mostly near the base, 2–3 mm. broad; *inflorescence linear-cylindric, of* 3–6 *distinct ascending ellipsoidal brownish-white spikes* (8–13 mm. long); *perigynia appressed*, 4–4.8 mm. long, 2–2.3 mm. broad, the *inner*

369. C. xerantica.

face nerveless or only slightly nerved at the *golden-yellow base.* — Open prairies, Man. to Kan., and westw. July. Fig. 369.

370. C. aenea.

22. **C. aènea** Fernald. *Culms* smooth and wiry, but more or less *flexuous at tip*, 0.25–1.2 m. high; leaves much shorter, rather soft and flat, 2–4 mm. broad; *inflorescence loosely cylindric or moniliform*, of 3–12 obovoid *mostly clavate-based brownish or ferruginous spikes* (0.8–2.5 cm. long, in luxuriant plants often peduncled or compound); *perigynia loosely ascending, dark green or brown when mature*, 4–5 mm. long, 1.9–2.7 mm. broad; *achene* 1.3–1.7 *mm. broad.* — Open woods, dry banks, or rarely in low ground, Lab. to B. C., s. to Ct., Mich., etc. May–July. Fig. 370.

371. C. adusta.

23. **C. adústa** Boott. *Culms stiffly erect*, smooth, 2–8 dm. high; leaves usually shorter, 2–5 mm. broad; *inflorescence erect, dense and stiff, ovoid or cylindric*, often subtended by a stiff prominent bract, of 3–15 simple or compound *full and rounded brownish spikes* (6–12 mm. long); perigynia 4–5 mm. long, 2–3 mm. broad; *achene* 1.8–2.1 *mm. broad.* — Dry woods, gravelly banks, etc., Nfd. to Mt. Desert I., Me., w. to Minn. and far northw. June–Sept. Fig. 371.

372. C. sychnocephala.

24. **C. sychnocéphala** Carey. Culms smooth, 2–6 dm. high; *leaves soft*, ascending, 2–4 mm. wide; bracts very unequal; *spikes* 4–10, subcylindric, 8–15 mm. long, *forming a dense ovoid or ellipsoid head; perigynia lance-subulate*, 5 mm. long, barely 1 mm. wide, firm, slightly nerved or nerveless. — Meadows, ditches, and wet sandy soil, N. Y. and Ont. to Ia., Sask., and B. C. July, Aug. Fig. 372.

373. C. gynocrates.

25. **C. gynócrates** Wormsk. *Culms* 0.6–3 dm. high, *mostly exceeding the setaceous leaves;* spikes 0.5–2 cm. long, some staminate and linear, with oblong mostly blunt-tipped scales, others staminate above, with one or more pistillate flowers below, others thick-cylindric and strictly pistillate, with 6–12 *rather plump subterete but thin-edged strongly nerved conic-beaked perigynia.* (*C. Redowskiana* Bailey, not C. A. Mey.) — Swamps and bogs, Lab. to Alaska, s. to N. B., Me., N. Y., w. Pa., Mich., and Col. June–Aug. (Eurasia.) Fig. 373.

374. C. exilis.

26. **C. exìlis** Dewey. *Culms rigid*, usually much exceeding the *filiform stiff leaves;* spikes mostly solitary, 1–3 cm. long, staminate, pistillate, or with the flowers variously situated; *perigynia* ovate-lanceolate, *with serrulate thin margins, strongly convex on the outer, flattish and few-nerved or nerveless on the inner face.* — Bogs and meadows near the coast, locally from Lab. to N. J.; rarely inland to Vt., Ont., N. Y., Mich., and Minn. May–Aug. Fig. 374.

375. C. stellulata.

27. **C. stellulàta** Good. Caespitose; the *culms rather wiry*, 1–4 dm. high; leaves shorter than or equaling the culms, 1–2.5 mm. wide; *inflorescence* linear-cylindric, 1–3 *cm. long, of* 2–6 *subapproximate* or slightly remote subglobose or subcylindric 3–12-*flowered spikes; perigynia finally yellowish, narrowly ovate*, early ascending, later wide-spreading, faintly nerved or nerveless

on the inner face, 3–4 *mm. long*, $\frac{1}{3}$ or $\frac{1}{2}$ exceeding the ovate pointed brownish scale. (*C. echinata*, var. *microstachys* Boeckl.; *C. sterilis* Am. auth., not Willd.) — Open low ground, Lab. to Alaska, s. to Md., O., Mich., etc. June–Aug. (Eurasia.) Fig. 375.

377. C. stell., v. excelsior.

Var. **ormántha** Fernald. *Inflorescence* 2–6 *cm. long, of* 2–4 *very remote* 3–9-*flowered spikes*, the terminal one with a clavate base 0.5–1 cm. long; perigynia as in the typical form, mostly twice as long as the scales. — Less common. Fig. 376.

376. C. stell., v. ormantha.

Var. **excélsior** (Bailey) Fernald. *Tall* and slender, 0.3–1 m. high; inflorescence 3–5.5 cm. long, *spikes* 3–9, *distinct*, only the lowermost remote, 12–20-flowered, at first ellipsoid, with the perigynia ascending, later subglobose, with strongly reflexed perigynia $\frac{1}{3}$ longer than the scales. — Nfd. to Mich. and N. C. Fig. 377.

Var. **cephalántha** (Bailey) Fernald. *The coarsest form*, 3–7 dm. high; *inflorescence* cylindric or slightly moniliform, 3–7.5 *cm. long, the* 4–8 *short-cylindric spikes* 15–40-*flowered*; perigynia ovate. (*C. echinata*, var. Bailey.) — Nfd. to Mich., B. C., and N. C. Fig. 378.

378. C. stell., v. cephalantha.

Var. **angustàta** Carey. *Extremely slender* or almost setaceous, 1–2 dm. high (in shade often higher); *leaves* 0.5–1.5 *mm. wide; inflorescence* 0.75–2.5 *cm. long*, the few 3–15-*flowered spikes approximate;* the divaricate *perigynia lanceolate or lance-ovate*, 2.5–3 *mm. long*, twice exceeding the scales. (*C. echinata*, var. Bailey; *C. sterilis*, var. Bailey.) — N. S. to Ct., w. Que., Ill., and Wisc. Fig. 379.

379. C. stell., v. angustata.

28. **C. stérilis** Willd. *Coarse*, 1 m. or less tall; leaves flat, shorter than or equaling the culms; *inflorescence of* 3–6 *subglobose or thick-cylindric densely flowered olive-green crowded or distinct spikes; the thick strongly many-nerved perigynia broad-ovate*, 3–3.5 *mm. long*, 2–3 *mm. broad*, squarrose or with recurved tips. (*C. echinata*, var. *conferta* and *C. atlantica* Bailey.) — Coastal bogs and pine-barrens, Nfd. to Fla., rarely inland to n. Me., Adirondack Mts., N. Y., and Mt. Sorrow, Pa. June, July. Fig. 380.

380. C. sterilis.

29. **C. scirpoìdes** Schkuhr. *Slender*, 1.5–5 dm. high; the *leaves* 1–2.5 *mm. wide;* the 2–5 *spikes* all fertile, all sterile, or variously mixed, usually subglobose, 4–5 *mm. in diameter, the terminal long-clavate at base; perigynia firm, plump, olive-green or -brown*, more or less nerved or essentially nerveless, *broadly deltoid-ovate, obscurely short-beaked* and with slightly thickened margin, 2.3–3.2 *mm. long*, 1.5–2 *mm. broad*, finally wide-spreading or recurved, much exceeding the oblong or ovate *blunt scales*. (*C. interior* Bailey.) — Damp or wet soil, e. Que. to Hudson Bay, B. C., Fla., and Ariz. May–Aug. Fig. 381.

381. C. scirpoides.

Var. **capillàcea** (Bailey) Fernald. Stiff, *culms almost bristle-like; leaves about* 0.5 *mm. broad*, often involute; *perigynia strongly nerved*. (*C. interior*, var. Bailey.) — N. H. to N. Y., N. J., and Pa.

Var. **Josselýnii** Fernald. *Perigynia lance-subulate, barely* 1 *mm. broad, mostly ascending.* — By St. John R., Me.

382. C. seorsa.

30. **C. seórsa** E. C. Howe. *Culms soft*, in loose stools, 3.5–6.5 dm. high; *leaves* shorter, *soft, pale*, 2–4 mm. broad; inflorescence 2.5–7 cm. long, of 2–6 *mostly remote* subglobose or ellipsoid 6–20-

flowered green *spikes* (3.5–7 mm. long), the terminal usually with a long-clavate base, the lower often subtended by a setiform bract, *perigynia elliptic-ovate*, with a *narrow substipitate base*, wide-spreading or recurved, much exceeding the acutish scales. — Wet woods and swamps, e. Mass. to centr. N. Y. and Del. May, June. Fig. 382.

383. C. arcta.

31. **C. árcta** Boott. *Pale green* or somewhat glaucous; *culms very soft, in loose stools*, 1.5–6 dm. high, often overtopped by the *soft flat leaves* (2.5–4 mm. broad); inflorescence of 5–13 ovoid or subcylindric spikelets (6–11 mm. long); *perigynia cordate-ovate*, with a rather definite beak, strongly nerved on the outer, faintly on the inner face, 2–3 mm. long, 1.2–1.5 mm. broad, somewhat exceeding the acute often brown-tinged scales. (*C. canescens*, var. *polystachya* Boott.) — Wet woods, alluvial thickets, etc., Me. and Que. to B. C., s. to Mass., N. Y., Mich., and Minn. June–Aug. Fig. 383.

384. C. canescens

32. **C. canéscens** L. *Culms soft, in loose stools*, 1.5–6 dm. high; *leaves soft and flat*, shorter than or exceeding the culms; *inflorescence* 2.5–5 *cm. long*, of 4–7 short-cylindric to narrowly obovoid *appressed-ascending approximate* or slightly remote spikes; *perigynia* ovoid-oblong, usually serrulate toward the short-pointed tip, 1.3–1.7 mm broad, more or less nerved on both faces, somewhat exceeding the ovate pointed scale. — Wet places, Lab. to B. C., locally s. to Ct., and Mich. May–Aug. (Eurasia.) Fig. 384.

385. C. canesc., v. subloliacea.

Var. **subloliàcea** Laestad. Smaller; the spikes short-oblong or subglobose; *perigynia* smaller, *barely 2 mm. long*, smooth throughout. — Similar range. (Eu.) Fig. 385.

Var. **disjúncta** Fernald. Tall and lax, 3–8 dm. high; *inflorescence elongated, flexuous*, 0.5–1.5 dm. long; *spikes* 5–8, ellipsoid to cylindric, all but the terminal *remote*; perigynia as in the species. — Nfd. to Wisc., O., and Pa., common. Fig. 386.

386. C. canesc. v. disjuncta.

387. C. brunnescens.

33. **C. brunnéscens** Poir. *Very slender* and lax; culms 1.5–7 dm. high; leaves soft, flat; *inflorescence* 1–6 *cm. long*, of 3–6 more or less remote or approximate *subglobose or ellipsoid spikes* (3–7 *mm. long*); perigynia 2–2.7 mm. long, 1–1.5 mm. broad, serrulate at the base of the *distinct beak, loosely spreading when mature*. (*C. canescens*, vars. *alpicola* Wahlenb. and *vulgaris* Bailey.) — Open woods and dry rocky banks, Nfd. to B. C., s. to N. C., Mich., Wisc., etc. June–Aug. (Eu.) Fig. 387.

388. C. bromoides.

34. **C. bromoides** Schkuhr. *Very slender* and lax, *green*, scarcely glaucous; the culms 3–8 dm. long, mostly exceeding the soft flat leaves; *inflorescence loosely subcylindric*, 2–5.5 cm. long, of 2–6 *approximate or slightly scattered spikes* (0.5–2. *cm. long*); beak of the *perigynium* $\frac{1}{2}$–$\frac{2}{3}$ as long as the *strongly nerved* body, slightly exceeding the *oblong pointed scale*. — Rich low woods and swamps, N. S. to Ont., and southw. May–July. Fig. 388.

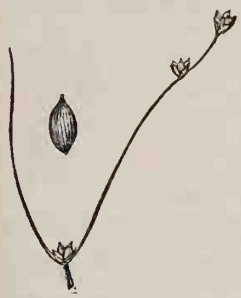
389. C. Deweyana

35. **C. Deweyàna** Schwein. Very lax, *glaucous*; the culms 2–12 dm. long, much exceeding the soft flat leaves; *inflorescence flexuous*, 2–6 cm. long; the 2–7 *spikes*, 3–12-*flowered* (5–12

mm. long), the upper subapproximate or scattered, the *lowest very remote*, usually subtended by an elongate slender bract; beak about ½ as long as the body of the perigynium, somewhat exceeding the *ovate acuminate or short-cuspidate pale scale.* — Rich open woods and banks, Que. to B. C., s. to Pa., Mich., Wisc., N. Mex., etc. May–Aug. Fig. 389.

390. C. tenuiflora.

36. **C. tenuiflòra** Wahlenb. Lax, the culms 2–6 dm. long, mostly exceeding the very narrow (0.7–2 mm. broad) pale green leaves; spikes 3–10-flowered; perigynia 1.5–1.7 mm. broad, with the bluntish tips smooth or rarely with 1 or 2 teeth, about equaled by the ovate or ovate-oblong white scale. — Bogs and wet mossy woods, local, Hudson Bay to Man., s. to N. B., Me., Mass., N. Y., Mich., Wisc., and Minn. June, July. (Eu.) — Apparently hybridizes with *C. trisperma* in n. Me. Fig. 390.



391. C. trisperma.

37. **C. trispérma** Dewey. Culms almost filiform, 2–7 dm. long, usually much overtopping the *soft narrow* (1–2 *mm. wide*) *leaves; the* 2 *or* 3 *spikes* 2–5-*flowered;* the finely many-nerved beaked *perigynia* 3.3–3.8 *mm. long*, 1.6–1.8 mm. broad, slightly exceeding the ovate-oblong pale obtuse to mucronate-acuminate scales. — Mossy woods and bogs, Nfd. to Sask., s. to Md., the Great Lakes, and Neb. June–Aug. Fig. 391.

Var. **Billíngsii** Knight. *Leaves nearly setaceous*, 0.3–0.5 *mm. wide;* the 1 or 2 spikes 1- or 2-flowered; *perigynium* 2.5–3.3 *mm. long.* — Boggy spots, local, N. S. and Me. to N. J.

392. C. norvegica.

38. **C. norvégica** Willd. *Glaucous* and *freely stoloniferous; culms smooth and soft*, 1–4.5 dm. high, mostly overtopping the soft flat rather narrow (1–2.5 mm. broad) leaves; inflorescence 1.5–5.5 cm. long, of 2–6 *ovoid or thick-cylindric spikes, the lower* 5–12 mm. long; *perigynia* faintly nerved, 2.5–3.3 mm. long, 1.6–2 mm. broad, *conic-rostrate*, usually abruptly contracted to a substipitate base. — Damp, usually brackish soil, locally on the coast from Me. northw. June–Aug. (Eu.) Fig. 392.

× C. hélvola Blytt is a hybrid of this with no. 32, occurring in N. B. and n. Eu.

39. **C. glareòsa** Wahlenb. *Culms acutely angled, mostly curved*, scabrous at tip, 1–3 dm. high, once and a half or twice exceeding the *flaccid narrow blue-green leaves; inflorescence* narrowly ellipsoid or obovoid, 0.7–2 cm. long, *with* 2–4 *appressed-ascending obovoid spikes, the lower* 4–9 *mm. long*, the *terminal* larger, 6–11 *mm. long; perigynia fusiform*, with narrow smooth beak, striate-nerved, 2.5–3 mm. long, *barely* 1 *mm.* broad, exceeding the *ferruginous or purplish white-edged* ovate acutish or obtuse *scales.* — Shores of the lower St. Lawrence, Que., and northw., local. June–Aug. (Eu.)

393. C. glareosa, v. amphigena.

Var. **amphígena** Fernald. *Perigynia* broadly ellipsoid, ovoid or obovoid, 1.3–1.9 *mm. long*, abruptly beaked. — Commoner, Arctic coast to Que. and N. B. (Eurasia.) Fig. 393.

394. C. tenella.

40. **C. tenélla** Schkuhr. *Exceedingly slender*, 1–6 dm. high, *in loose tufts;* leaves flat, soft, and weak, mostly shorter than the culm; *spikes* 1–3-*flowered*, or the terminal 4–6-flowered, *scattered* on the upper part of the culm, the bracts obsolete or the lowest present and very short; *perigynium very plump*, finely nerved, the minute beak entire, longer than the white scale, usually at length splitting and exposing the dark achene. — Cold swamps and wet woods, Nfd. to B. C., s. to N. J., Pa., Mich., Col., etc. May–Aug. (Eu.) Fig. 394.

41. **C. rò̀sea** Schkuhr. Always slender and weak, *erect*, 2–7 dm. high, culms exceeding the narrow (1.5–3 mm. broad) leaves; *spikes* 3–8, 6–15-*flowered*, *the uppermost aggregated, the others* 0.5–2.5 *cm. apart*, the lowest usually with a setaceous bract; *perigynium lance-ovoid*, plano-convex, shining, nerveless, *rough on the edges above*, with a flat bidentate beak, perfectly squarrose, very green, 2.5–4 mm. long, about twice longer than the *translucent white scale*. — Open dry woods, N. S. to Man., and southw. May–July. Fig. 395.

395. C. rosea.

Var. **radiàta** Dewey. Much more slender, the *loose culms* sometimes almost capillary; *spikes* 2–5, *scattered*, 2–4-*flowered*; perigynium mostly narrower. — Rich woods, e. Que. to Ont., and southw.; commonest in the Alleghenies.

Var. **minor** Boott. *Erect*, very slender; spikes 3–10-flowered; *perigynia ascending*. — Local, s. Me. to Mich.

396. C. retroflexa

42. **C. retrofléxa** Muhl. Similar; stiff, 1–6 dm. high; *spikes* 3–8, *mostly aggregated*, the lower 1 or 2 slightly separated and commonly subtended by a conspicuous bract, often brownish; *perigynium* ovoid, *smooth throughout*, very prominently corky and swollen at the base, at maturity widely spreading; *scales brownish and sharp*, at length deciduous. (*C. rosea*, var. Torr.) — Dry open woods, Mass. to Ont. and Tex. May, June. Fig. 396.

Var. **texénsis** (Torr.) Fernald. Spikes 3–5; perigynium lance-ovoid or lance-subulate. (*C. rosea*, var. Torr. · *C. texensis* Bailey.) — Ky. to Mo., and southw.

397. C. muricata.

43. **C. muricàta** L. Culm 1.5–8 dm. high, rough, longer than the narrow leaves; spikes 5–10, variously disposed, but usually some of them scattered, frequently all aggregated, rarely tawny; *perigynium heavy, ovate*, 4–6 *mm. long, shining, nerveless*, the long beak minutely rough, spreading, a little longer than the sharp green or brownish scale. — Dry fields, local, s. Me. to Va. and O. (Nat. from Eu.) Fig. 397.

398. C. Muhlenbergii.

44. **C. Muhlenbérgii** Schkuhr. *Plant very stiff throughout*, pale, growing in small tufts, 2.5–8 dm. high; culms much prolonged beyond the few *narrow* (2.5–4 mm. broad) and *at length plicate or involute leaves; head* 1.5–4 *cm. long*, the *individual spikes clearly defined*; spikes globular, 3–10; *perigynium nearly circular*, very strongly nerved on both faces, broader than the *rough-cusped scale* and about as long. — Open sterile soils; s. Me. to Ont., and southw. June, July. Fig. 398. Var. **enérvis** Boott. Perigynium nearly or entirely nerveless. (Var. *xalapensis* Britton.) — Mass. to Neb., and southw.

399. C. cephalophora.

45. **C. cephalóphora** Muhl. Strict but soft, 2–7 dm. high; leaves 2–4.5 mm. wide; *head small*, 0.7–1.8 *mm. long*, globular or very short-cylindric, *never interrupted*, the lower 1 or 2 spikes usually bearing a very setaceous short bract; *perigynium elliptic-ovate*, about 2 mm. long, slightly longer than the acute or rough-cusped scale. — Dry woods and knolls, Me. to Ont., and southw. May–July. Fig. 399.

400. C. Leavenworthii.

46. **C. Leavenwórthii** Dewey. In habit resembling the last, usually more lax, 1–5 dm. high; leaves 1–3 mm. wide; head 0.7–1.5 cm. long; *perigynia cordate-deltoid*, exceeding the acutish rarely cuspidate scale. (*C. cephalophora*, var. *angustifolia* Boott.) — Damp woods and banks, Ont. to Ky., Fla., and Tex. May, June. Fig. 400.

47. **C. sparganioides** Muhl. Culm 4–10 dm. high; leaves very broad

(5–9 mm.) and flat, their *sheaths conspicuously clothing the base of the culm; spikes* 6–12, *the* 2 *or* 3 *upper ones contiguous, the remainder entirely separate, very green,* short-cylindric, the lowest often compound, all truncate at top; perigynium ovate, 3–4 mm. long, rough on the short beak, often obscurely nerved on the outer face, considerably longer than the whitish sharp-pointed scale. — Rich woods, N. H. to Ont., Mo., and Va. June, July. Fig. 401.

401. C. sparganioides.

48. **C. cephaloídea** Dewey. Lax, very green, 3–9 dm. high; leaves broad (5–8 mm.) and thin, shorter than the long soft culm; *head* 1.8–3.8 cm. long, *rather dense; perigynium narrowly ovate,* 3.5–4.5 mm. long, *pale green, nerveless,* with long rough beak, spreading. — Rich woods and thickets, local, N. B. to Pa., Wisc., and Ont. May–July. Fig. 402.

402. C. cephaloidea.

49. **C. alopecoídea** Tuckerm. Stout but rather soft, 4–9 dm. high; *culm rather sharp,* thick and soft in texture; leaves 4–8 mm. wide, about the length of the culm, very green; *head* 2–6 cm. long, *straw-color or tawny,* occasionally a little compound, the *spikes* many and compactly or somewhat loosely disposed or the lowest often separate and all mostly *short-cylindric; perigynium* 3–4 mm. long, 1.5–2 *mm. broad, tapering into a rough beak, very prominently stipitate, with a few brown nerves on the outer face,* ascending, about equaling or a little exceeding the scale; *achene obovate,* 1 *mm. broad, style not thickened at base.* — Open swales and low thickets, Me. to Ont. and Ill.; local. June, July. Fig. 403.

403. C. alopecoidea.

50. **C. grávida** Bailey. Low, the *culm thin* and *sharply angled,* 2–5 dm. high; leaves rather firm, shorter than the culm; *head* 2–4 cm. long, *greenish to pale brown,* short-cylindric, the lowest spikes rarely distinct; *spikes globular; perigynium* 3–4.5 mm. long, 2–3 *mm. broad, sessile,* plump and somewhat polished at maturity, prominently spreading; *achene suborbicular,* 1.5–2 *mm. broad, style bulbous-thickened at base.* — Ind. and Wisc. to Neb., and southw. Fig. 404. Var. LAXIFÒLIA Bailey. Much larger, 6–12 dm. high; leaves broader and lax; head large and dense, ovoid or thick-cylindric, scarcely interrupted. — Ky. to S. Dak. and Mo.

404. C. gravida.

51. **C. vulpinoídea** Michx. Mostly rather stiff, 0.3–1 m. high; *culm very rough, at least above; leaves* 2–5 mm. broad, *mostly* flat and *longer than the culm; head* 2–15 cm. long, *usually much interrupted or dense or somewhat compound,* varying from dull brown to almost green at maturity, commonly provided with many very setaceous short bracts; spikes very numerous, ascending and densely flowered; *perigynium ovate or lance-ovate,* mostly ascending, 1.7–3 cm. long; *scales mostly long-awned.* — Low places, variable. June–Aug. Fig. 405.

405. C. vulpinoidea.

52. **C. setàcea** Dewey. Resembling the last; *culms* stiff, 0.4–1 m. high, *much exceeding the* rather broad (2–7 mm.) stiffish *leaves;* head usually simple, 3.5–9 cm. long, of approximate or remote spikes; *perigynia lanceolate to lance-ovate,* tapering gradually to the serrulate beak, usually *dull brown or drab* in

406. C. setacea.

407. C. set., v. ambigua.

maturity; *scales short-awned.* — Vt. to Ont. and Ky.; June–Aug. Fig. 406.

Var. **ambígua** (Barratt) Fernald. *Perigynia broad-ovate to orbicular*, abruptly short-beaked, often golden-brown. (*C. vulpinoidea*, var. *ambigua* Barratt; *C. xanthocarpa* Bicknell.) — Dry soil, s. Me. to Ia., and southw. Fig. 407.

408. C. decomposita.

53. **C. decompósita** Muhl. Stout, exceedingly deep green, 0.5–1 m. high, in stools; *culm very obtusely angled*, almost terete below; *leaves firm*, channeled below, 5–8 *mm. wide*, *longer than the culm; panicle* 1–1.5 *dm. long*, the lower branches ascending and 1.5–3.5 cm. long; *perigynium* very small, *few-nerved*, hard and at maturity shining, the *abrupt short beak* entire or very nearly so; scale acute, about the length of the perigynium. — Swamps, N. Y. to Mich., and southw.; local. July, Aug. Fig. 408.

409. C. diandra.

54. **C. diándra** Schrank. Slender but mostly erect, 3–8 dm. high, in loose stools; *culm* rather obtuse, rough at the top, *mostly longer than the narrow* (1–3 *mm. broad*) *plicate leaves; head* 1.5–5 *cm. long*, 0.5–1 cm. thick; *perigynium* very small, *truncate below*, bearing a few inconspicuous short nerves on the outer side, *stipitate*, firm and at maturity *blackish and shining*, the short beak lighter colored; scale the length of the perigynium. (*C. teretiuscula* Good.) — Bogs and wet meadows, e. Que. to the Yukon, s. to Ct., Pa., Mich., Neb., etc. May–July. (Eu.) Fig. 409.

Var. **ramòsa** (Boott) Fernald. Tall (0.5–1.2 m.); *head* 3–8 cm. long, *the upper portion often nodding*, the usually *pale spikes scattered* and the lowest often slightly compound; *perigynia brown.* (*C. teretiuscula*, var. *prairea* Britton.) — Bogs, e. Que. to B. C., s. to Ct., Pa., O., Ill., Minn., and Utah. Fig. 410.

410. C. diandra, v. ramosa.

411. C. conjuncta.

55. **C. conjúncta** Boott. Strict but rather weak, 0.5–1 m. high; *culm* soft and *sharply triangular or nearly wing-angled*, becoming ribbon-like when pressed; leaves soft, 5–10 mm. broad; head 3.5–7.5 cm. long, interrupted, pale green, infrequently bearing a few setaceous bracts; *perigynium* lance-ovate, *light-colored*, *whitish and thickened below*, the beak lightly notched and roughish, *almost equaling or a little exceeding the* cuspidate *scale.* — Swales and glades, Pa. to Ky., Ill., Ia., and Minn.; local. June. Fig. 411.

412. C. stipata.

56. **C. stipàta** Muhl. Stout, 0.2–1 m. high, in clumps; culm rather soft, very sharp; leaves flat and soft, 4–15 mm. wide; head 2–10 cm. long, often somewhat compound at base, interrupted, the lowest spikes 0.7–2 cm. long; *perigynium lanceolate*, *brown-nerved*, the beak toothed and roughish, about twice the length of the body, and *much longer than the scale.* — Swales, common and variable. May–Aug. Fig. 412.

57. **C. crus-córvi** Shuttlw. Stout, glaucous, 0.5–1 m. high; culm rough, at least above; leaves flat and very wide (6–12 mm.); *head much branched and compound*, 6.5–23 *cm. long; perigynium long-lanceolate*, *the short base very thick and disk-like*, the roughish and very slender beak thrice the length of the body or more, 3–4 times the length

of the inconspicuous scale. — Swamps and bottoms, Ind. to Minn., Neb., and southw.; rare northw. June, July. Fig. 413.

413. C. crus-corvi.

58. **C. arenária** L. *Extensively creeping*, 0.7–5 dm. high; *leaves very narrow and very long-pointed*, shorter than the culm; head dense or sometimes interrupted, ovoid or cylindric; *spikes* few to many, those *at the apex of the head usually staminate*, the intermediate ones staminate at the summit, the lowest entirely pistillate and subtended by a bract 1–3 cm. long; perigynium very strongly nerved on both faces, wing-margined above, sharply long-toothed, about the length of the *brown subulate-acuminate scale.* — Sea-beaches near Norfolk, Va. (Nat. from Eu.) Fig. 414.

414. C. arenaria.

59. **C. Sartwéllii** Dewey. Culms stiff and strict, 0.3–1.2 m. high, from an *elongate dark rootstock;* leaves (2–5 mm. wide) produced into a long slender point, mostly shorter than the culm; *staminate flowers variously disposed*, frequently whole spikes being sterile; head 2.5–7 cm. long and rather narrow, *the individual spikes* usually *clearly defined*, or occasionally the head interrupted below, *tawny-brown;* perigynium 3–5 mm. long, elliptic or lance-elliptic, nerved on both sides, very gradually contracted into a short beak; *scale blunt, smooth, hyaline-edged*, about the length of the perigynium. — Bogs, centr. N. Y. to B. C., s. to O., Ill., Ia., S. Dak., etc. June, July. Fig. 415.

415. C. Sartwellii.

416. C. stenophylla.

60. **C. stenophýlla** Wahlenb. Stiff, *tufted*, 0.5–2.5 dm. high; *leaves pale, involute* and shorter than the culm; perigynium ovate, gradually contracted into a short and entire rough-edged beak, tightly inclosing the achene, at maturity longer than the *hyaline acutish scale.* — Dry grounds, n. Ia. to the Rocky Mts., and northw. June, July. (Eurasia.) Fig. 416.

61. **C. chordorrhìza** L.f. Very *extensively stoloniferous; culms* mostly lateral and *solitary*, 1–4.5 dm. long; *leaves involute*, shorter than the culm; *perigynium compressed-ovoid to sub-globose*, short-pointed and entire, about the length of the acute scale. — Cold bogs and soft lake-borders, Que. to B. C., s. to Me., Vt., Pa., Ill., Ia., etc.; infrequent. May–July. (Eurasia.) Fig. 417.

417. C. chordorrhiza.

419. C. maritima.

62. **C. capitàta** L. *Rigid*, 0.7–5 dm. high; *leaves filiform*, shorter than the culm; *head uniformly staminate above*, brown, very small, 0.5–1 *cm. long; perigynium* broadly ovate, very thin, *whitish*, prominently beaked, nerveless or nearly so, erect and appressed, longer than the very thin and obtuse scale. — Alpine region of Mt. Washington, N. H. June–Aug. (Eu.) Fig. 418.

418. C. capitata.

63. **C. marítima** O. F. Mueller. Mostly stout; *culm sharp*, smooth or rough above, 2–7 dm. high, *usually overtopped by the leafy tufts* and the broad bracts; leaves smooth and flat, strongly ribbed, 3.5–10 mm. broad; pistillate spikes 2–6, scattered, 2–8 cm. long, 0.8–2 cm. thick, often staminate at tip; staminate spikes 2–4, unequal, the terminal 2–6 cm. long; *perigynium nearly orbicular*,

pale, few-nerved or nerveless, the beak very short and entire, or nearly so; *scale whitish or brown, produced into a pale rough awn 3–8 times as long as the perigynium.* — Brackish or saline shores, Lab. to Mass. June–Aug. (Eu.) FIG. 419.

64. **C. salina** Wahlenb., var. **cuspidàta** Wahlenb. Rather stout, 3–9 dm. high; culm rather sharp, smooth; leaves narrow (2–5 mm. wide) but flat; pistillate spikes 2–4, somewhat approximate, erect, 2–7 cm. long and rather thick, the lower subtended by leaf-like bracts; staminate spikes 1–3; *perigynium elliptic*, somewhat granular, marked with 2 or 3 nerves, or nerveless, the minute beak entire; *scale brown-margined, mostly produced into a lighter and rough awn much exceeding the perigynium.* — Salt marshes, Lab. to Mass. — Apparently hybridizes with *C. stricta*. July, Aug. (Eu.)

65. **C. crinìta** Lam. Robust and mostly stout, 0.3–1.6 m. high; *culm sharp* and rough or sometimes smooth; leaves 4–10 mm. broad, flat, more or less rough on the nerves and margins, the lower short and at the base of the culm reduced to *smooth fibrillose sheaths; pistillate spikes* 3–6, somewhat scattered, all variously peduncled, *mostly secund*, 3.5–10 *cm. long*, narrowly and evenly cylindric, often staminate at tip; staminate spikes usually 2, rarely pistillate at tip; *perigynia* suborbicular to ovate, 2–3 mm. long, *thin and inflated, becoming wrinkled in drying, nerveless, puncticulate or granular*, with a minute entire beak; *scales greenish-brown and rough-awned*, 2–3 times as long as the perigynia. — Swales and damp thickets, generally common. — Hybridizes with *C. torta* and *C. scabrata*. June–Aug.

Var. **minor** Boott. Much smaller in all parts; 4–6 dm. high; leaves 4–5 mm. wide; *spikes* 1–3.5 *cm. long, ascending;* perigynia 2 mm. long; scales less prominent. — Me. to N. Y., scarce.

Var. **Portèri** (Olney) Fernald. Like small *C. crinita*, but spikes very slender; *perigynia compact, not inflated*, oblong-lanceolate, distinctly beaked; scales lance-attenuate. (*C. gynandra*, var. *Porteri* Britton.) — Moosehead Lake, Me. (*Porter*).

Var. **gynándra** (Schwein.) Schwein. & Torr. *Harsher;* leaves broad (4–12 mm.), *the sheaths hispidulous;* culms tall; staminate spikes 1 or 2, generally pistillate above; *pistillate spikes* soft, loosely flowered, *drooping*, 2.5–10 *cm. long; perigynia ascending*, elliptic or ovate-lanceolate, 3–4 *mm. long*, subinflated. (*C. gynandra* Schwein.) — Nfd. to Wisc., and in the mts. to Ga.

Var. **simulans** Fernald. Harsh as in var. *gynandra;* low; leaves 4–6 mm. broad; *spikes suberect*, the terminal androgynous, 1–3.5 *cm. long*, scarcely drooping; perigynia 3 mm. long. — Nfd. to Vt. and Mass., chiefly in the mts.

66. **C. aquátilis** Wahlenb. *Glaucous*, 3–9 dm. high; *culm very obtuse and smooth; leaves exceedingly long*, 4–7 mm. broad, the bracts broad and prolonged far beyond the culm; *pistillate spikes* 3–5, 1.5–5.5 cm. long, very compact or the lowest sometimes attenuate below, *erect;* perigynia round-ovate or broadly elliptic, nerveless, greenish, imbricated; *scales dark, shorter than or equaling the perigynia.* — Swamps and lake margins, Que. to B. C., s. to the Potomac R., w. N. Y., Ind., etc. June–Aug. (Eurasia.)

Var. **elàtior** Bab. *Robust*, 0.9–1.5 m. high; leaves 5–8 mm. broad; *pistillate spikes stout and heavy*, 3.5–8 cm. long. — Me. to Man., s. to N. Y., O., and Mich.

Var. **cuspidàta** Laestad. Spikes slender, 3–4 mm. thick; *scales cuspidate, exceeding the perigynia.* — Local, Que. to N. J.

Var. **viréscens** Anders. *Scales pale and short*, hidden by the crowded perigynia. — Local, Vt. to Ont. and Mich.

67. **C. rígida** Good. Somewhat *stoloniferous*, low (0.5–4.5 dm. high); *leaves shorter than* the mostly smooth *culms*, rather crowded at base, smooth, dark green, firm, broad (3–7 mm.), *becoming revolute in drying; pistillate spikes* 1–5, *subglobose to short-cylindric, dense*, 0.5–2.5 cm. long, 4–6 mm. thick, the lowest bractless or leafy-bracted; staminate spike 1 (rarely 2), sometimes pistillate at base; *perigynia elliptic*, greenish or purplish; *scales elliptic, brown to purple-black.* — Arctic regions, south to mts. of Que., Rocky Mts., etc. July, Aug. (Eurasia.) — Passing to the formal Var. BIGELÒWII (Torr.) Tuckerm., with *pistillate spikes elongate* (1.5–4 cm. long, 2.5–5 mm. thick), *the lower attenuate at base.* — Extending s. to mts. of n. N. E. and N. Y. (Eu.)

68. **C. tórta** Boott. Slender but erect, 2–9 dm. high, *in clumps*, with exceedingly tough and *cord-like roots;* culm rather sharp, smooth or roughish above; *leaves* flat and rather *soft*, those of the culm *very short* (2–5 mm. wide); *pistillate spikes* 2–6 (rarely compound), mostly somewhat approximate or the lower remote, the upper sessile and ascending, but the others often spreading or drooping, *long and slender* (1.5–9 cm. long, 3–6 mm. thick); staminate spike 1(rarely 2)-peduncled, 1.5–4 cm. long, occasionally with some pistillate flowers; *perigynium lance-ovate, green, the slim upper half empty and more or less tortuous*, the beak entire or erose; *scale purple-margined and very obtuse*, shorter than the perigynium. — By streams, rarely in swamps, e. Que. to Minn., s. to N. C. and Mo. May–July. Fig. 420.

420. C. torta.

421. C. lenticularis.

69. **C. lenticulàris** Michx. Rather slender but erect, *pale throughout*, 1–6 dm. high; culm sharp, usually slightly rough above; *leaves very narrow* (1–3 mm. wide), numerous, *much surpassing the culm;* spikes 3–8, more or less aggregated or the lowest remote, the terminal androgynous or staminate, mostly sessile, erect, 1–4.5 cm. long, 2.5–4 mm. thick; *perigynia ovate, minutely granular, brown-nerved*, the tip empty and entire; scales obtuse, about ½ the length of the perigynia. — Gravelly or sandy shores, Lab. to the Mackenzie, s. to Mass., N. Y., Mich., Minn., etc. June–Sept. Fig. 421.

70. **C. Goodenòwii** J. Gay. *Loose or slightly caespitose*, 0.5–9 dm. high; culm sharp, smooth or rather rough above; *leaves narrow* (1–3 mm. wide) and stiff, shorter than the culm, *glaucous-blue, the margins involute in drying;* pistillate spikes 1–4, all sessile or rarely the lowest very short-stalked, short and erect (0.8–4.5 cm. long, 4–6 mm. thick), very densely flowered or sometimes becoming loose below, the lowest usually subtended by a bract 2–10 cm. long; *perigynia appressed, oval or round-ovate, mostly fine-striate toward the base*, the beak entire or very nearly so, bright green *becoming tawny; scale* ovate and very obtuse, conspicuously *narrower and shorter than the perigynia.* (*C. vulgaris* Fries.) — Across the continent northw., extending s. in swales and open places, chiefly along the seaboard, to Mass. and e. Pa. May–Sept. (Eurasia.)

71. **C. stricta** Lam. Tall and slender but erect, 0.5–1.3 m. high, generally *in dense clumps* when old, or rarely in small tufts; *culm sharp, rough above;* leaves long and narrow (2–4 mm. wide), rough on the edges, the *lowest sheaths usually becoming prominently fibrillose;* 1 or 2 lowest bracts leafy and equaling the culm; *pistillate spikes* 2–6, scattered, the lowest often more or less peduncled and clavate and the others sessile, erect or ascending, oblong or cylindric, 2–7 *cm. long*, 3–6 *mm. thick*, compactly flowered above but often attenuate at base, the upper often staminate at top, all greenish-purple or pallid; *perigynia becoming tawny*, mostly *lightly few-nerved* and somewhat granular, the beak very short and commonly entire; *scale* brown, with a pale middle, *nearly or quite equaling the perigynia.* — Swales, throughout; abundant and variable. May–Aug. — Hybridizes with *C. filiformis* and *C. salina*, var. *cuspidata.*

Var. **curtíssima** Peck. Scales of the *very short* (0.5–1.5 *cm. long*) *pistillate spikes* much shorter than the perigynia. — N. B. to Ct. and N. Y., rare.

Var. **angustàta** (Boott) Bailey. *Spikes* longer and narrower (3–11 *cm. long* 2–4 *mm. thick*), more approximate and mostly attenuate at base, usually with long staminate tips; *scales* narrower, *mostly longer than the perigynia.* (Including var. *xerocarpa* Britton.) — Same range as the type, but less common.

Var. **decòra** Bailey. Usually smaller; basal sheaths less fibrillose; *spikes* 1–4 *cm. long*, 4–7 *mm. thick*, sessile or very nearly so, rarely attenuate at base,

slightly if at all staminate at tip; *scales very sharp and spreading, longer than the perigynia.* (*C. Haydeni* Dewey.) — Me. to Ky., Ont., and Ia.

72. **C. aúrea** Nutt. Low and slender, 0.5–5 dm. high; *leaves pale green*, narrow (1–3 mm. wide); 2 or 3 of the bracts exceeding the culm; *spikes* 3–5, all but the lowest usually approximate, peduncled or the upper one or two sessile, erect, loosely few-flowered or sometimes becoming 2 cm. long, *at maturity yellow or brown*, the terminal one frequently pistillate above; *perigynium fleshy at maturity, plump*, nerved, about 2 mm. long, rounded or slightly depressed at tip, longer than the blunt *white or pale-brown scale.* — Wet meadows and springy banks, Nfd. to B. C., s. to n. Ct., centr. N. Y., n.w. Pa., Ind., Wisc., etc., mostly in calcareous regions. June–July. Fig. 422.

422. C. aurea.

73. **C. bícolor** All. Similar; spikes mostly crowded, only the lowermost subtended by an elongated bract, the others short-bracted or bractless, the terminal mostly pistillate; mature *perigynia dry and firm, white, pulverulent*, tapering to the short tip; *scales dark brown or purplish.* — Wet ledges and gravelly shores, Lab. to n. Me.; n. shore L. Superior. June–Aug. (Greenl., Eu.) Fig. 423.

423. C. bicolor.

74. **C. pauciflòra** Lightf. Very slender but erect, *stiff*, 0.5–6 dm. high; leaves very narrow, usually much shorter than the culm; staminate and pistillate flowers 2–5; *perigynia straw-color, subulate*, several times longer than the inconspicuous scales, at maturity *deflexed and easily detached.* — Cold bogs, Nfd. to Alaska, locally s. to Ct., Pa., Mich., Minn., etc. June, July. (Eu.) Fig. 424.

424. C. pauciflora.

75. **C. leptàlea** Wahlenb. Capillary, erect or slightly diffuse, 0.5–5 dm. high; leaves mostly shorter than the culm; spike 0.4–1.6 cm. long, staminate portion small, the *subalternate* thin green nervose oblong or narrowly ellipsoid blunt *perigynia* about twice longer than the *brownish* mostly obtuse caducous *scales.* (*C. polytrichoides* Muhl.) — Bogs and wet meadows, Nfd. to B. C., s. to Pa., the Great Lakes, Mo., Col., and Ore.; and in the mts. to N. C. June–Aug. Fig. 425.

425. C. leptalea

76. **C. Harpèri** Fernald. Similar, 2.5–7 dm. high; the more crowded spike with *strongly overlapping* linear-oblong *perigynia* and *whitish* acuminate *scales.* — Bogs and swampy woods, Pa. to Fla. and Tex. May–July. Fig. 426.

426. C. Harperi.

77. **C. Frasèri** Andrews. Caespitose; *culm* 2–5 dm. high, *naked or the lower portion included in loosely sheathing leaves*, smooth and stiff; *leaves broad, destitute of midrib, closely many-ribbed*, very thick and persistent, pale, 1.5–6 dm. long; *spike solitary, the pistillate portion globular, the longer staminate tip oblong;* perigynia straw-colored, papery, ovoid, faintly nerved, much longer than the *whitish scales.* — Rich mountain woods, Va., W. Va., and southw.; local. May–July. Fig. 427.

427. C. Fraseri × 2/3
Inflorescence and leaf-tip.

78. **C. Hallèri** Gunn. Small and slender, 1–6 dm. high; *culm thin and obtuse*, smooth or roughish, naked above; leaves narrow and flat, shorter than the culm; *spikes* 2–4, *aggregated*, 4–8 *mm. long, sessile* or rarely the lowest short-stalked; *perigynia* orbicular to elliptic, nerveless or nearly so, the short beak slightly notched, *a little longer than the ovate purple-brown obtuse scales.* (*C. alpina* Sw.) — Cold wet rocks, e. Que., L. Superior region, Rocky Mts., and far northw. July, Aug. (Eu.) Fig. 428.

428. C. Halleri.

79. C atràta L., var. **ovàta** (Rudge) Boott. Very slender but erect, 2–9 dm. high; *culm rather sharp*, roughish above; leaves narrow but flat, shorter than the culm; *spikes* 3–6, all but the terminal one *on slender stalks*, drooping when mature, 1–2.5 *cm. long*, ellipsoid or short cylindric, *reddish-brown to purplish-black;* perigynia broadly ovate, thin and puncticulate, very short-beaked, the orifice slightly notched; *scales blunt*, thin-margined, *about as long as the perigynia.* (*C. atratiformis* Britton.) — By streams and in cold ravines, Nfd. to Athabasca, locally s. to the mts. of n. N. E. June–Aug. Fig. 429.

429. C. atrata, v. ovata.

430. C. polygama.

80. **C. polýgama** Schkuhr. Rather slender but stiff, 2–9 dm. high; culm sharp, roughish above; leaves very narrow, rough, mostly shorter than the culm; *spikes* 2–7, the terminal rarely all staminate, *sessile and approximate* or the lowest very short-stalked, from globular to narrowly cylindric, 0.7–5 cm. long, *dark brown or variegated; perigynia* elliptic and beakless, *whitish and granular*, nearly nerveless, the orifice entire; *staminate scales very long-lanceolate, the pistillate lance-ovate and very sharp, conspicuously longer than the perigynia.* (*C. fusca* Man. ed. 6, not All.; *C. Buxbaumii* Wahlenb.) — Bogs and wet shores, e. Que. to Alaska, s. to Pa., Great Lake region, Mo., Utah, and Cal.; and in the mts. to N. C. May–July. (Eu.) Fig. 430.

431. C. triceps, v. hirsuta.

81. **C. trìceps** Michx., var. **hirsùta** (Willd.) Bailey. Slender; *leaves* narrow, *hairy;* spikes 2–4 (usually 3), all contiguous or occasionally the lowest somewhat removed, sessile, thick-cylindric to globular, green or brown (4–7 mm. thick); *perigynia broad-ovoid, flattish*, very obtuse, often sparsely hirsute when young but *smooth at maturity;* staminate scales very sharp; pistillate scales acute or short-awned, about the length of or shorter than the perigynia. (*C. triceps* Britton in part, not Michx.) — Copses and dryish meadows, N. E. to Ont., and southw., rare northeastw. May–July. Fig. 431. — Hybridizes with *C. gracillima.*

432. C. virescens.

Var. **Smíthii** Porter. Tall, slender, olive-green, the *leaves* very long, *very nearly smooth;* spikes small, globular to cylindric, the lowest often somewhat remote, all more inclined to be peduncled; *perigynia globular and turgid, brown*, squarrose, exceeding the *brownish scales.* (*C. caroliniana* Schwein.) — Fields and woodlands, Gulf States, locally n. to N. Y., Ill., and Mo. May, June.

433. C. vir., v. Swanii.

82. **C. viréscens** Muhl. Slender, erect or spreading, 0.4–1 m. high; *leaves* very narrow, more or less *hairy; spikes* 2–4, sessile or slightly stalked, compact, *linear-cylindric*, 2–4 *mm. thick; perigynia ellipsoid-ovoid*, compressed, *costate*, usually longer than the thin whitish acute scales. (Var. *costata* Dewey; *C. costellata* Britton.) — Dry banks and copses, s. Me. to s. Ont., and southw. June, July. (W. I.) Fig. 432. — Hybridizes with *C. arctata* and *C. debilis*, var. *Rudgei.*

Var. **Swànii** Fernald. Lower, 1.5–8 dm. high, the 2–5 *thick-cylindric to subglobose spikes* 3–5 *mm. thick; the perigynia less strongly ribbed.* (*C. virescens* Man. ed. 6, not Muhl.) — Similar range. Fig. 433.

83. **C. formòsa** Dewey. Slender, erect, 3–9 dm. high; leaves flat, often pubescent, 3–7 mm. broad, those of the culm short; spikes 3–5, scattered, ellipsoid or cylindrical, 1–3 cm. long, compact, all flexuose or drooping; *perigynia*

434. C. formosa.

greenish, inflated, ovoid, puncticulate, *obscurely nerved*, short-beaked with a *slightly notched orifice*, all but the lowest one or two twice *longer than the blunt or cuspidate* whitish *scales*. — Woods and copses, w. N. E. to Ont. and Mich.; local. May, June. Fig. 434.

84. **C. Davísii** Schwein. & Torr. Similar; spikes, 3–7, heavier, 1.5–4.5 cm. long; *perigynia* more inflated, *strongly nerved and prominently toothed*, *equaled by the conspicuously awned* and spreading *scales*. — Meadows and wet woods, w. Mass. to s. Minn., and southw.; rare eastw. and northw. May, June. Fig. 435.

435. C. Davisii.

85. **C. gracíllima** Schwein. Tall and slender, sometimes diffuse, 0.3–1 m. high; *leaves broad* and flat (*the radical 5–9 mm. wide*), very dark and bright green; *spikes* 3–6, scattered, the terminal rarely staminate, *densely flowered* except at base, peduncled and drooping, or sometimes ascending, green, 2–6 cm. long, 2–3 mm. thick; *perigynia* ovoid, thin and slightly swollen, nerved, *obtuse*, orifice entire, twice longer than the very obtuse whitish scale. — Woodlands and meadows, generally common. May–July. Fig. 436. — Var. HÙMILIS Bailey is apparently a starved form. Hybridizes with *C. triceps*, var. *hirsuta*, *C. pubescens*, and *C. aestivalis*.

436. C. gracillima.

86. **C. aestivàlis** M. A. Curtis. Slender but erect, 2.5–6 dm. high; *leaves very narrow*, 1.5–3 *mm. wide*, flat, shorter than the culm, *the sheaths pubescent;* spikes 3–5, erect or spreading, 1.5–4.5 cm. long and very *loosely flowered*, short-stalked; perigynia ovoid, scarcely pointed and the orifice entire, few-nerved, about twice longer than the *obtuse or mucronate scale*. — Rocky woods, mostly on upland slopes, N. H. to Ga., rare. June–Aug. Fig. 437.

437. C. aestivalis

87. **C. oxýlepis** Torr. & Hook. Similar; 2–8 dm. high; *leaves* 3–7 *mm. wide; perigynia* 4–5 mm. long, ellipsoid, acute, prominently few-nerved, *glandular-dotted*, slightly exceeding the *long-acuminate white scales*. — Rich woods, S. C. to Mo., and southw. April, May. Fig. 438.

438. C. oxylepis.

88. **C. Shortiàna** Dewey. Tall, 3–9 dm. high, in small clumps; leaves 0.4–1 cm. broad, flat, rough on the nerves; *spikes* 3–6, somewhat approximate near the top of the culm, the lowest 2 or 3 short-peduncled, erect, 1–3.5 cm. long, 4–6 mm. thick, *evenly cylindrical*, exceedingly *densely flowered; perigynia scabrous*, *sharp-edged*, the orifice entire, *squarrose;* scales thin and blunt, about the length of the perigynia. — Meadows and low woods, Pa. to Ont., Ia., and southw. May, June. Fig. 439.

439. C. Shortiana

89. **C. Báckii** Boott. Forming dense mats; leaves dark green, 3–5 mm. broad, stiff, very abundant and overtopping the very unequal culms; spikes solitary, terminating short and long slender culms (0.1–3 dm. long); *staminate flowers*

440. C. Backii.

about 3; pistillate 2–5; perigynia gradually beaked; *scales very broad and leaf-like, entirely enveloping the spike.* (*C. durifolia* Bailey.) — Dry rocky or sandy wooded slopes, e. Que. to Assina. and B. C., locally s. to Mass., N. Y., the Great Lake region, Neb., and westw. May–July. Fig. 440.

90. **C. Willdenòwii** Schkuhr. Similar, softer and paler; leaves 1.5–4 mm. wide; spike compact; pistillate flowers 3–9, *staminate* 6–12; perigynia with a rougher beak; *scales chaffy*, nerved, as broad as and *somewhat longer than the perigynia, or the lowest rarely overtopping the spike.* — Rocky woods, Mass. to Mich., and southw., local. May–July. Fig. 441.

441. C. Willdenowii.

91. **C. Jamèsii** Schwein. Similar; leaves 1–2 mm. wide, much surpassing the culm; spike very small; *staminate flowers* 8–20; pistillate 1–3 and loosely disposed; perigynia produced into a very long and roughened nearly entire beak; *scales narrow, the lowest often elongate, the upper often shorter than the perigynia.* — Woods, N. Y. and Ont. to Mo., and southw.; frequent. May, June. Fig. 442.

442. C. Jamesii.

92. **C. scirpoídea** Michx. *Strict*, the pistillate plant mostly stiff, 1–7 dm. high; staminate plant smaller; leaves flat, shorter than the culm; *spike* 1.5–4 cm. long, *densely cylindrical*, very rarely with a rudimentary second spike at its base; perigynia ovoid, short-pointed, very hairy, exceeding the *ciliate purple scales.* — Arctic regions, s. by cold streams and in alpine districts to Cape Breton, N. S., n. N. E., n. N. Y., L. Huron, Rocky Mts., etc. June–Aug. (Eurasia.) Fig. 443.

443. C. scirpoidea.

93. **C. umbellàta** Schkuhr. *Low* and conspicuously *caespitose, forming dense mats;* leaves rather stiff, 0.5–4.5 dm. long, 1–4.5 mm. wide; *culms* mostly short and *crowded* at the base of the leaves, or some elongate (rarely 2 dm.), bearing either staminate or pistillate spikes, or both; pistillate spikes 0.5–1 cm. long, mostly sessile; *perigynia* plump, stipitate, *puberulent*, 3.2–4.7 *mm. long*, the slender *beak nearly equaling the ellipsoid-ovoid to subglobose body*, and about equaled by the *acuminate* green or purple-tinged *scales.* (*C. deflexa*, var. *media* Bailey and var. *Farwellii* Britton.) — Dry sandy or rocky soil, P. E. I. to centr. Me., w. to Sask. and B. C., s. to N. J., D. C., and I. T. Apr.–July. Fig. 444. Var. tónsa Fernald. Similar; *perigynia glabrous or merely puberulent on the angles* of the long beak. — Local. Fig. 445.

444. C. umbellata.

445. C. umb., v. tonsa.

446. C. umb., v. brev.

Var. **breviróstris** Boott. Perigynia smaller, the broad *beak about* $\frac{1}{3}$ *as long as the hairy body.* — Que. to Sask. and B. C., s. to n. N. E., N. Mex. and Cal. Fig. 446.

94. **C. nìgro-marginàta** Schwein. Leaves mostly stiffer, often 2–4 dm. long, 2–4 mm. wide; some of the culms prolonged; *perigynia* smooth or nearly so, *fusiform*, 3–4 mm. long; *scales ordinarily purple-margined*, giving the spikes a very dark or variegated appearance, *equaling or exceeding the perigynia.* — Dry sandy or rocky soil, on the coastal plain, extending locally n. to Ct. Apr.–June. Fig. 447.

447. C. nigro marginata.

95. **C. deflèxa** Hornem. Diffuse and low, *tufted;* leaves soft, 1–3 mm. wide; *culms* 0.2–4 dm. high, *setaceous*, more or less *curved or spreading*, little exceeding or shorter than the leaves; *staminate spike small*, sometimes invisible in the head; *pistillate spikes* 2–3, 2–8-flowered, green, or green and brown, *all aggregated into a head, or the lowest one slighty remote, short-peduncled* and subtended by a leafy bract; radical spikes usually present; perigynia very small and much contracted below, sparsely hairy or nearly smooth, the beak flat and very short, longer than the scales. (Including var. *Deanei* Bailey.) — Open woods, clearings, and mountain slopes, Nfd. to Alaska, s. to Mass., Pa., Mich., Minn., Wash., etc. May–Aug. (Greenl.) Fig. 448.

448. C. deflexa.

96. **C. álbicans** Willd. Slightly caespitose; *culms straightish*, 1–5.5 dm. tall, *much exceeding the soft narrow* (1.5–3 mm. wide) *pale leaves; pistillate spikes* globose or short-ovoid, 1–3, all *approximate*, or the lowest slightly remote, naked or subtended by a narrow bract; *staminate spike sessile, often hidden in the head; perigynia ellipsoid*, pubescent, with a short cylindric beak, mostly *exceeding the broad scales.* — Open woods or cool rocky banks, chiefly in calcareous regions, e. Que. to the Yukon, s. to Mass., Pa., Mich., and Minn. May–July. Fig. 449.

449. C. albicans.

97. **C. commùnis** Bailey. Forming small tufts, never stoloniferous; *culms* 1–6 dm. high, much *exceeding the leaves; leaves flat, becoming* 2–5.5 *mm. wide;* inflorescence 1–8 cm. long; the 1–5 pistillate *spikes mostly distinct*, often remote, rarely 1 cm. long, the lowest often leafy-bracted; staminate spike from green to chestnut, sessile or stalked, 3.5–20 mm. long; perigynia hairy, 2.5–4 mm. long, the *body subglobose to broadly ellipsoid*, the base elongate and spongy, the beak broad; *scales* ovate, acuminate, greenish-brown to reddish, *about equaling the perigynia.* (Including var. *Wheeleri* Bailey; *C. pedicellata* Britton; *C. pilulifera* Fernald, not L.) — Dry open woods, etc., e. Que. to B. C., s. to Pa., O., Wisc., and Ia.; and along the mts. to Ga. May–July. Fig. 450.

450. C. communis.

98. **C. vária** Muhl. *Densely tufted;* leaves soft and very narrow; the *capillary culms* variable in length, *lax*, often twice longer than the leaves, 1–5 dm. long; *pistillate spikes closely aggregated*, or rarely somewhat loosely disposed but never scattered, *all strictly sessile*, green; *radical spikes none;* lower bract usually present; perigynia about the length of the sharp scale. — Banks and dry woods, Me. to Ont., and southw. Apr.–July. Fig. 451. In var. COLORÀTA Bailey the *scales* are *purple.*

451. C. varia.

99. **C. nòvae-ángliae** Schwein. *Very slender and soft*, loosely caespitose, 1–4 dm. high; culms little longer than the *very narrow pale-green leaves; staminate spike exceedingly narrow* (0.5–1 *cm. long*, 0.5–1 *mm. thick*), mostly minutely peduncled; *pistillate spikes* 2, or rarely 3, the upper one near the base of the staminate spike, *the lower very short-peduncled* and remote and subtended by a leafy bract which nearly or quite equals the culm, rather *loosely* 3–10-*flowered; perigynia very narrow*, small, *very thin*, slightly hairy, the beak sharp and prominent. — Open woods, Que. and N. S. to Mass. and N. Y.; common northw., rare southw. June, July. Fig. 452.

452. C. novae-angliae.

453. C. pennsylvanica.

100. **C. pennsylvánica** Lam. *Strongly stoloniferous*, the small tufts with reddish bases and usually with *persistent brush-like tufts of fibers;* leaves 1.5–3.5 mm. broad, shorter than, equaling or often exceeding the slender culms (0.5–4 dm. high); pistillate spikes 1–4, globose or ovoid, approximate or remote, the lowest often leafy-bracted;

staminate spike clavate, 1–2 cm. long, sessile or short-stalked, usually reddish, rarely paler; perigynia puberulent, globose to obovoid, *the short beak* $\frac{1}{4}$ *to* $\frac{1}{3}$ *as long as the body;* the scales usually red-tinged. — Dry or sandy soil, s. Me. to Alb., and southw. May, June. Fig. 453.

454. C. penn., v. lucorum.

Var. lucòrum (Willd.) Fernald. Perigynia puberulent to glabrate, the conspicuous *slender beak about as long as the body.* — Richer, usually damper soil, Me. to Mich., and the mts. of N. C. May–July. Fig. 454.

101. C. pubéscens Muhl. Lax, 2–8 dm. high, *pubescent throughout; leaves flat* (0.5–1 *cm. wide*) *and soft*, shorter than the culm; *spikes* 2–4, the upper approximate, the lower 1 or 2 short-peduncled, short-cylindric, 0.7–2.3 cm. long, *loosely flowered*, erect; *perigynia very hairy, sharply 3-angled*, conspicuously beaked and minutely toothed, straight, about the length of the truncate and rough-cuspidate thin scales. — Copses and moist meadows, N. E. to Ky., and westw., local. May, June. Fig. 455.

455. C. pubescens.

102. C. caryophyllèa Lat. *Slightly stoloniferous, stiff;* the culm sometimes curved, 0.3–3 dm. high; *leaves flat*, shorter than the culm; *staminate spike* prominently clavate, mostly *sessile; pistillate spikes* 2–3, *all contiguous*, sessile or the lowest very short-peduncled and subtended by a bract scarcely as long as itself, all ellipsoid or short-cylindric, the lowest 0.7–1.5 cm. long; *perigynia* trigonous-obovoid, the very short beak entire or erose, *thinly hispid-hirsute.* (*C. praecox* Jacq.) — Fields, Me. to D. C., local. May, June. (Nat. from Eu.) Fig. 456.

456. C. caryoph.

457. C. glauca.

103. C. glaúca Scop. *Very stoloniferous and glaucous;* the culms *stiff*, 1–6 dm. high; *leaves* shorter, *firm*, with revolute *scabrous margins*, 3–6 mm. broad; staminate spikes 2 (rarely 1), clavate, the terminal 2–3.5 cm. long, peduncled; pistillate 1–3, cylindric, 1.5–3.5 cm. long, 4–6 mm. thick, remote, mostly peduncled, erect; the subglobose or ellipsoid *puncticulate perigynia* slightly exceeding the oblong blunt or mucronate purplish scales. — Dry open soil, local, N. S., Que., and Ont. June, July. (Nat. from Eu.) Fig. 457.

458. C. livida.

104. C. lívida (Wahlenb.) Willd. *Very glaucous* and *stoloniferous;* culms 1.5–6 dm. high; *leaves* narrow, often *becoming involute;* pistillate spikes 1 or 2, subapproximate or remote, sessile or nearly so, erect, or rarely basal and long-stalked, narrow, 0.7–2.5 cm. long, 3–6 mm. thick; perigynia ovoid-oblong, nerved, granular, beakless, the point straight or nearly so, orifice entire; *scale obtuse, brown- or purple-margined*, mostly a little shorter than the perigynia. — Bogs, chiefly in calcareous regions, Lab. and Nfd. to Alaska, locally s. to Ct., N. J., Mich., Minn., etc. May–July. (Eu.) Fig. 458.

459. C. panicea.

105. C. panícea L. Strict, often stiff, *glaucous-blue*, 1.5–6 dm. high; *culm smooth; bracts broad and short*, 1–6 cm. high; pistillate spikes 1–3, scattered, colored, mostly peduncled, erect, rather compact or loose below, 1–3 cm. long, 5–7 mm. thick; *perigynia* ovoid, yellow or purple, somewhat *turgid*, scarcely nerved, the point usually curved, mostly longer than the purple-

460. C. tetanica.

margined scale. — Bogs and meadows, near the coast, N. S. to Ct., local. May–July. (Perhaps introd. from Eu.) FIG. 459.

106. **C. tetánica** Schkuhr. Slender, rarely glaucous, somewhat stoloniferous; *culms scabrous, at least above*, 1–6 dm. high; leaves 1.5–4.5 mm. wide; spikes all peduncled, the upper one very shortly so, pale, all more or less attenuate below, 0.7–4 cm. long, the lower borne in the axils of *bracts* 0.5–2 *dm. long; perigynia not turgid*, greenish, somewhat nerved, the beak strongly bent; scale obtuse or abruptly mucronate, all except the lowest mostly shorter than the perigynia. — Meadows and bogs, w. N. E. to Man., and southw. May–July. FIG. 460. Var. WOODII (Dewey) Bailey. Very slender; leaves narrow, very long and lax; *spikes mostly alternate-flowered* throughout; scales often sharper. — Mass. to Ont., Mich., and D. C., local.

461. C. tet., v. Meadii.

Var. **Meàdii** (Dewey) Bailey. *Stiffer; leaves* mostly *broader* (2.5–5 mm. broad) *and stricter; spikes thick* and densely flowered, not attenuate at base, the upper one often sessile; perigynia larger. (Var. *Canbyi* Porter; *C. Meadii* Dewey.) — Pa. to Man., and southw. FIG. 461.

462. C. polymorpha.

107. **C. polymórpha** Muhl. Stout, 3–6 dm. high, from *stout cord-like rootstocks;* leaves rather broad (3.5–5 mm.), short; *spikes* 1–2, short-stalked, erect, *compact* or rarely loose, usually staminate at the apex, 1.5–4 cm. long, 5–9 mm. thick; perigynia long-ovoid, obscurely nerved; the very *long and nearly straight beak oblique or lipped at the orifice; scales* reddish-brown, *obtuse*, shorter than the perigynia. — Open woods and meadows, s. Me. to N. C., local. June–Aug. FIG. 462.

108. **C. vaginàta** Tausch. *Very slender* and more or less *diffuse, strongly stoloniferous*, 2–8 dm. high; leaves narrow (1.5–5 mm. broad) and soft, shorter than the culm; *spikes* 1–3, scattered, all peduncled and more or less spreading, *loosely* 3–20-*flowered;* perigynia small, nearly nerveless, thin, the beak straightish; *scales* loose, *acute*, shorter than the perigynia. (*C. saltuensis* Bailey; *C. altocaulis* Britton.) — Bogs and mossy woods, Lab. to the Yukon, s. to N. B., n. N. E., N. Y., Mich., Minn., Alb., and B. C. June–Aug. FIG. 463.

463. C. vaginata.

109. **C. abbreviàta** Prescott. *Stiff*, 1.5–5 dm. high; *culm and leaves thinly pubescent;* spikes globose to thick-cylindric, 0.5–1.5 cm. long; perigynia equaling or exceeding the mostly *cuspidate scales.* (*C. Torreyi* Tuckerm.)—Wooded slopes, Minn. to Sask. and Col.; supposed to have been collected in N.Y. by *Torrey*, and in Pa. by *Schweinitz.* June, July. FIG. 464.

464. C. abbreviata.

110. **C. palléscens** L. Slender, erect, 1–6 dm. high; *leaves* narrow, flat, the lower slightly *pubescent*, particularly *on the sheaths;* spikes 2–4, 0.5–2 dm. long, densely flowered, all but the upper one very shortly peduncled, erect or spreading; perigynia about the length of the cuspidate scales. — Glades and meadows, Nfd. to Pa., Wisc., and Ont. May–Aug. (Eu.) FIG. 465.

465. C. pallescens.

111. **C. paupércula** Michx. Slender but erect, *tufted*, 1–2.5 *dm. high, glabrous;* leaves flat and lax, somewhat shorter than the culm; *lowest bract* as wide as the leaves or nearly

so and *exceeding the culm; spikes* 2–3, approximate, all slenderly stalked, spreading or drooping, 4–8 *mm. long; perigynia* orbicular or broad-ovate, nerved in the middle, $\frac{1}{2}$–$\frac{2}{3}$ *the length of the castaneous scales.* — Alpine bogs, e. Que. Aug.

Var. **irrigua** (Wahlenb.) Fernald. *Taller*, 1–8 dm. high; *culm glabrous; spikes* cylindric, 1–1.6 *cm. long; scales castaneous.* (*C. magellanica* Man. ed. 6, not Lam.) — Bogs, Arctic regions, s. to Mass., Pa., Ont., and Utah. June–Aug. (Eu.) Fig. 466.

466. C. paup., v. irrigua.

Var. **pállens** Fernald. Tall, the *culms usually scabrous;* spikes cylindric, 1–1.8 cm. long; *scales green with pale brown or yellowish margins.* — Bogs and mossy woods, e. Que. to B. C., s. to Ct., N. Y., Mich., and Minn. June, July.

467. C. limosa.

112. **C. limòsa** L. Slender but rather stiff, 1.5–6 dm. high, *very stoloniferous; culm sharp, rough above;* spikes 1–2, nodding on short stalks or the upper one erect, subcylindric, 1–2.5 cm. long, springing from the axil of a very narrow *bract* which is nearly always *shorter than the culm; perigynia* very short-pointed, *about the length of the broad brown or purplish scales.* — Bogs, e. Que. to Sask. and B. C., s. to Pa., Great Lake region, Col., and Cal. May–Aug. (Eu.) Fig. 467.

468. C. rariflora.

113. **C. rariflòra** Smith. Very small but stiff, 0.7–3.5 dm. high, slightly stoloniferous; *culm obtuse and very smooth;* spikes 1–3, only 3–10-flowered, drooping, borne in the axil of a *minute awl-like and purple-auricled bract;* perigynia ovate, nearly pointless, obscurely nerved, mostly a little shorter than the *purple-black enveloping scales.* — Cold bogs and granitic slopes, Arctic regions; very locally s. to Gulf of St. Lawrence; Table-topped Mt., Gaspé Co., Que.; and Mt. Katahdin, Me. (*Goodale*). (Eu.) Fig. 468.

469. C. littoralis.

114. **C. littoràlis** Schwein. Somewhat slender but erect, 4–9 dm. high, *stoloniferous; leaves* 3–6 *mm. broad*, stiff, flat, *glaucous*, shorter than the sharp and nearly smooth often solitary culms; staminate spikes 1–3, dark purple, 5.5 cm. long or less, the scales obtuse; *pistillate spikes* 1–4, somewhat approximate, on thread-like peduncles, *narrowly cylindric* (2–5 *cm. long*, 5–7 *mm. thick*), usually staminate at top; perigynia lance-oval, faintly nerved, the minute beak entire, mostly longer than the *obtuse purple scale;* bracts prominently purple-auricled. — Wet woods and bogs, oftenest near the coast, Ct., and southw., local. May, June. Fig. 469.

470. C. prasina.

115. **C. prásina** Wahlenb. Slender, somewhat flexuous, 3–7 dm. high; culm rather sharp, smooth; leaves 2.5–5 mm. wide, soft and flat, rough; *spikes* 2–4, *linear-cylindric*, peduncled and spreading or drooping, somewhat approximate, *green*, 1.5–6 cm. long, loosely flowered; *perigynia* pale, thin, nearly nerveless, *produced into a short* but slender entire or minutely toothed *beak; scale* very thin and *acute, nearly colorless.* — Wet woods and glades, w. Me. to Ont., Mich., D. C., and Del.; and along the mts. to Ga. May–July. Fig. 470.

116. **C. pícta** Steud. Rather weak, 1.5–3 dm. high; *leaves* flat and *firm.*

persisting through the winter, at least twice longer than the culm; *a sheathing purple scale at the base of the spike; staminate spike* 2.5–6 *cm. long*, clavate in anthesis, the *purple scales ending in* a very short and *blunt whitish tip; pistillate spike* narrower and *mostly longer*, the *scales* more abruptly *contracted into a colored cusp* and at length deciduous; *perigynia* much *contracted* below *into* a *stipe-like base*, very strongly nerved, pointless, *hairy above, covered by the scales.* — In a wooded ravine near Bloomington, Ind. (*Dudley*); also Ala. and La. Fig. 471.

471. C. picta.

117. **C. ebúrnea** Boott. Tufted from a *rigid pale brown* stoloniferous *base; culms capillary, wiry*, 1–4 dm. high; *leaves involute-filiform*, shorter than the culm; *staminate spike* very small (4–8 mm. long), sessile or very short-peduncled, *overtopped by the two upper pistillate spikes; pistillate spikes* 2–4, approximate or the lowest remote, all stalked, *erect*, 2–6-*flowered; perigynia very small* (1.5–2 *mm. long*), almost nerveless, smooth and *becoming black and shining* at full maturity; *scales white* and thin, obtuse, shorter than the perigynia. (*C. setifolia* Britton.) — Limestone ledges or shingle, rarely in sand, e. Que. to the Mackenzie, s. locally to Va., Ky., Mo., and Neb. May–Aug. Fig. 472.

472. C. eburnea.

473. C. pedunculata.

118. **C. pedunculàta** Muhl. Low and diffuse, 0.5–3 dm. high, forming mats; *leaves* abundant, very green, flat and firm, 2–5 mm. wide, *mostly longer than the weak culms; staminate spike* small, usually *slightly pistillate at base; pistillate spikes* 2–4 on each culm, *scattered and long-peduncled from green sheaths*, erect or spreading, many *other spikes* nearly or quite *radical* and very long-stalked, all 3–8-*flowered;* perigynia smooth or very slightly pubescent above, the short and nearly entire beak somewhat oblique; *scales* green to purple, *truncate and cuspidate*, mostly a little longer than the perigynia. — Rich woods and banks, e. Que. to Sask., s. to Va., O., Mich., and Minn. Apr.–June. Fig. 473.

474. C. concinna.

119. **C. concínna** R. Br. Loosely caespitose; culms slender, curving, 0.5–2 dm. high; leaves dark green, mostly shorter, 1–3 mm. wide; *staminate spike* 4–7 *mm. long*, sessile or short-peduncled; pistillate 2 or 3, the *upper* sessile and *approximate*, 3–10-*flowered; perigynia narrowly trigonous-ovoid*, hairy, blunt, 2.5–3 mm. long, *much exceeding* the *dark* pale-margined *roundish scales.* — Mossy knolls and cold wooded banks, e. Que. to the Mackenzie, s. to n. N. B., Ont., and Mont. June, July. Fig. 474.

475. C Richardsoni.

120. **C. Richardsòni** R. Br. Rather stiff, 1–3 dm. high; *stoloniferous;* sheaths short, purple or brown; leaves 2–4 mm. wide; *staminate spike* stout and mostly short-peduncled, 1.5–2.5 *cm. long;* pistillate spikes 1–3, the very short stalks included, erect, compact; *perigynia obovoid*, firm, hairy, the very short beak entire or erose; *scales* brown, *with a conspicuous white-hyaline margin*, obtuse or pointless. — Dry ground, Ont. to B. C., s. to w. N. Y., Ill., Ia., S. Dak., etc. May, June. Fig. 475.

121. **C. plantagínea** Lam. Slender but erect, 2.5–5.5 dm. high; *leaves very firm, appearing after the flowers* and persisting over winter, shorter than the culm; staminate spike purple and clavate, stalked, 1.3–2.5 cm. long; pistillate spikes 3–4, scattered, loosely few-flowered, 1–2.5 cm. long, erect, the peduncles mostly included in the *leafless sheaths; perigynia* 3–4.5 mm. long, sharply 3-angled, prominently beaked, *slightly*

longer than the sharp scales. — Rich woods, N. B. to Man., s. to N. C., Ind., and Ill. Apr.–June. Fig. 476.

476. C. plantaginea × ⅔. Fruiting culm, perigynium, and leaf-tip.

122. **C. Careyàna** Torr. Tall and slender, mostly erect, 3–8 dm. high; leaves bright green, firm, 1–1.5 cm. wide, shorter than the long culm; *bracts leafy;* staminate spike heavy and stalked, 1.3–2.3 cm. long; pistillate spikes 2–3 (mostly 2), erect, the upper usually near the terminal spike, and nearly sessile, the other remote and long-peduncled, loosely 2–8-flowered; *perigynia* very sharply angled, the beak oblique, finely many-nerved, *twice longer than the sharp scales.* — Rich woods, N. Y. and Ont. to Mich. and D. C., local. May, June. Fig. 477.

477. C. Careyana.

123. **C. platyphýlla** Carey. Low, spreading, *glaucous*, 1–4 dm. high; leaves mostly shorter than the culms; *bracts with* thin and sharp-pointed *leaf-like tips;* staminate spike stalked; pistillate spikes 2–3, scattered, all more or less peduncled, alternately 2–10-flowered; perigynia strongly many-striate, about the length of the acute or cuspidate scales. — Rich shady woods and banks, s. Me. to Ont., s. to Va. and Ill. May, June. Fig. 478.

124. **C. laxicúlmis** Schwein. Caespitose; culms slender and lax, 1.5–5.5 dm. long; *leaves* usually very *glaucous*, mostly shorter than the culms, broad (6–12 mm.); staminate spike usually peduncled, 1–2 cm. long; pistillate 3–5, very remote, on capillary flexuous peduncles, 0.7–1.5 cm. long, 3.5–5 mm. thick; the spreading-ascending sharply trigonous-ovoid *perigynia* 2.8–3.2 *mm. long*, equaling or exceeding the scales. — Glades and rich woods, s. Me. to Va., and Mo. May–July. Fig. 479. In the interior passing to var. COPULÀTA (Bailey) Fernald. Glaucous or sometimes deep green; spikes 1–2 cm. long; *perigynia* 3.3–4 *mm. long.* (*C. digitalis*, var., Bailey.) — Vt. to Del., O., Mich., and Ont.

479. C. laxiculmis.

480. C. digitalis.

478. A. platyphylla.

125. **C. digitàlis** Willd. *Very slender, bright green*, tufted, 1.5–5 dm. high; leaves narrow; staminate spike short-stalked; pistillate *spikes* 2–4, on filiform stalks, ascending or slightly spreading, linear, 1–3 cm. long, *alternately flowered;* perigynia 2.5–3 mm. long, longer than the *acute whitish scales.* — Dryish woods and glades, Me. to Ont., Mich., and southw. May–July. Fig. 480.

126. **C. ptychocárpa** Steud. Low, *glaucous;* culms 0.3–1.8 dm. high; *leaves* flat and rather broad (4–8 mm.), *much exceeding the culms; bracts* leafy and *much prolonged; staminate spike very small* and sessile, *mostly overtopped by the upper pistillate spike;* pistillate spikes 2–3, sessile or short-stalked or rarely the lowest long-peduncled, erect, 0.7–1.5 cm. long; perigynia tawny, narrowly

481. C. ptychocarpa.

trigonous-ovoid, twice longer than the very thin *obtuse scales*. — Low woods, Mass. to Fla. and La., local. June, July. Fig. 481.

127. **C. laxiflòra** Lam. Slender but mostly erect, 2–5.7 dm. high; basal leaves 2.5–7 mm. wide, rather soft; *staminate spike peduncled or at least conspicuous; pistillate spikes* 2–4, *scattered*, peduncled or the upper one sessile, *loosely flowered, cylindric*, 1.5–3 *cm. long*, erect or the lower loosely spreading; perigynia obovoid, conspicuously nerved, the short entire *beak much bent or recurved;* scales thin and white, blunt or cuspidate, mostly shorter than the perigynia. — Rich woods and meadows, e. Que. to w. Ont., and southw. May–July. Fig. 482. — Exceedingly variable, passing by many transitions to the following.

482. C. laxiflora.

483. C. lax., v. gracillima.

Var. **gracíllima** Boott. Similar; but with *short* (0.5–1.3 *cm. long*) *oblong* fewer-flowered *spikes*. — Vt. to Ont., and southw. Fig. 483.

484. C. lax., v. pat.

485. C. lax., v. Mich.

Var. **patulifòlia** (Dewey) Carey. Leaves 0.6–2 cm. broad; staminate spike prominent, mostly stalked; *pistillate spikes long* (2–4.5 *cm.*) *and alternately flowered, scattered* and peduncled; *perigynia* 2.5–4 mm. long, ellipsoid, *attenuate at both ends*, mostly less prominently nerved, and the *beak not strongly recurved*. — Me. to Va., O., Mich., and Ont. Fig. 484.

Var. **Michaúxii** Bailey. Tall and comparatively stout, 4–6 dm. high; leaves 0.7–1.2 cm. broad; staminate spike large and stalked; pistillate spikes scattered, all but the upper one prominently peduncled, 1.2–3 cm. long; *perigynia very large*, 4–5 *mm. long, divaricate*. (Var. *divaricata* Bailey.) — Pa. to Ala. and Tex. Fig. 485.

Var. **styloflèxa** (Buckley) Boott. Very *weak* and slender, 3–9 dm. high; leaves 3–6 mm. wide; staminate spike usually peduncled; *pistillate* 2–3, *scattered*, few-flowered, 0.5–2 cm. long, lowest drooping; *perigynia oblong-fusiform*, 4–5 mm. long, *very long-pointed;* scales often brown-tinged. (*C. styloflexa* Buckley.) — Ct. to Fla. and Tex. Fig. 486.

486. C. lax., v. styl.

Var. **vàrians** Bailey. Culms often ancipital, 2.5–5 dm. high; leaves 0.3–1.2 cm. broad; *pistillate spikes* 1–3 cm. long, *linear-cylindric to narrow-oblong, the two upper* more or less *contiguous to the staminate spike* and sessile or nearly so; bracts leafy and prolonged. — Me. to Ont., Ia., and southw.

Var. **blánda** (Dewey) Boott. Leaves 0.5–1.4 cm. broad; *culms* soft, *ancipital*, 1.5–6 dm. high; *pistillate spikes oblong*, 0.5–2 *cm. long, the upper sessile*

and aggregated about the inconspicuous staminate spike, the lowest usually long-exserted. (Var. *striatula* Carey.) — Vt. and e. Mass. to Ont., and southw. Fig. 487.

Var. **latifòlia** Boott. Rather low, 2–6 dm. high; *culms winged; leaves* 1.5–4 *cm. broad; staminate spike* sessile or very nearly so, *hidden by the pistillate; pistillate spikes cylindric and loose*, 1.5–3 cm. long, the upper one or two contiguous; bracts very broad. (*C. albursina* Sheldon.) — Deep rich woods, w. Que. and Vt. to Ont., and southw. Fig. 488.

487. C. lax., v. blanda.

488. C. lax., v. latifolia.

Var. **leptonérvia** Fernald. Slender, 1.5–7 dm. high; leaves 0.5–1 cm. broad; pistillate spikes linear-cylindric, loosely flowered, 1–2.5 cm. long, the 2 or 3 upper crowded at the base of the staminate, the lower remote; *perigynia* oblong-fusiform, *faintly nerved or nerveless.* — Nfd. to Ont., s. to n. N. E., N. Y., and Mich.; and in the mts. to N. C. Fig. 489.

489. C. lax., v. lept.

490. C. Hitchcockiana.

128. **C. Hitchcockiàna** Dewey. Erect, 3–7 dm. high; leaves 3–7 mm. broad; *spikes* 2–4, all more or less peduncled, *very loosely few-flowered*, erect, 1–2.5 cm. long, the bracts elongate and leafy; *perigynia* triangular-ovoid, many-striate, 4–5 *mm. long*, the strong beak prominently oblique, *shorter than the scales.* — Rich woods, Vt. to Ont., s. to Ky. and Mo. May–July. Fig. 490.

129. **C. oligocárpa** Schkuhr. Diffuse, 1–5 dm. high; leaves 2–4.5 mm. wide; bracts elongate, spreading; staminate spike sessile or stalked; *pistillate spikes* 2–4, scattered, stalked or the uppermost sessile, *loosely* 2–8-*flowered*, erect, 0.5–1.5 cm. long; *perigynia* 3.5–4 *mm. long*, hard, finely impressed-nerved, abruptly contracted into a conspicuous mostly oblique beak, the orifice entire; *scales* very loosely spreading, *longer than the perigynia.* — Dry woods and copses, Vt. to Ont., Ia., and southw. May–July. Fig. 491.

491. C. oligocarpa.

130. **C. katahdinénsis** Fernald. Densely caespitose; leaves 1–2.5 dm. long, 3–4 mm. broad, with the similar *bracts much* (2–6 *times*) *overtopping the low* (1–6 *cm. high*) rough-angled *culms;* pistillate *spikes* 3 or 4, *approximate*, or the lowest remote, short-pediceled, 8–14 mm. long, 5–10-*flowered; staminate spike* 5–8 mm. long, *generally hidden among the pistillate;* perigynia ellipsoid, 3–4 mm. long, many-nerved, beakless, mostly exceeding the whitish green-awned scales. — Gravelly shore of a pond, Mt. Katahdin, Me.; rocky bank, Lake St. John, Que. (*Brainerd*). July, Aug. Fig. 492.

492. C. katahdinensis.

131. **C. conoídea** Schkuhr. Slender but strict, 1.5–7 dm. high; *staminate spike long-peduncled or rarely nearly sessile; pistillate spikes* 2–3, *scattered*, short-stalked or the upper one sessile (the lowest frequently very long-stalked), narrowly ellipsoid, 0.7–2.5 cm. long, *rather closely flowered*, erect; perigynia oblong-conical, 3–4 mm. long, impressed-nerved, gradually narrowed to a point, the orifice entire; scales loosely spreading and rough-awned, equaling or exceeding the perigynia. — Moist grassy

493. C. conoidea.

places, N. B. to Ont., s. to Pa. and Ia. and in the mts. to N. C. May–Aug. Fig. 493.

132. **C. grísea** Wahlenb. Stout, 3–8 dm. high; *leaves 3–7 mm. broad*, slightly glaucous; *bracts broad and leaf-like, diverging*, very much exceeding the culm; staminate spike small and sessile; pistillate spikes 3–5, oblong, 0.7–2.5 cm. long, 4–7 mm. thick, the highest two usually contiguous to the staminate spike and sessile, the others somewhat remote and peduncled (but not from the lowest axils), all erect; *perigynia oblong, pointless*, marked with *impressed nerves, turgid and cylindric, appressed-ascending*, 4.5–5.5 mm. long, all but the lowest longer than the narrow, cuspidate or blunt, nerved scale. — Low woods and meadows, s. Me., westw. and southw. May, June. Fig. 494. Var. rígida Bailey. Much more slender; *leaves scarcely half so wide;* the bracts, especially, much narrower and shorter and more erect; spikes slender; *perigynia scarcely inflated, triangular-oblong, bearing a beak-like point*, 2-ranked. (Var. *angustifolia* Man. ed. 6, not Boott.) — Local, Mass. and N. Y., southw. Var. globòsa Bailey. Very slender; spikes few-flowered, often with but 2 or 3 perigynia; *perigynium short, inflated, very blunt, nearly globose or obovoid;* scale short, not prominently cuspidate or the upper ones wholly blunt. — Mo., Kan., and southw.

494. C. grisea.

495. C. gris., v. ang.

Var. **angustifòlia** Boott. Leaves rather narrow, long and erect; staminate spike often peduncled; *pistillate spikes very scattered*, all more or less stalked, *the lowest borne from near the base; perigynia triangular-oblong, hard*, longer than the cuspidate ascending scale. (*C. amphibola* Steud.) — D. C. to Fla. and Tex. Fig. 495.

133. **C. glaucòdea** Tuckerm. Lax or somewhat strict (1–6 dm. high), *densely glaucous; leaves* flat, *thick and firm*, 0.5–1 cm. wide; spikes as in *C. grisea; perigynia firm, not inflated*, prominently impressed-nerved, *glaucous*, 3–4 *mm. long*, mostly exceeding the short-cuspidate or blunt thin and appressed scale. — Upland woods and rich meadows, e. Mass. and Vt. to Ont., and southw., local. June, July. Fig. 496.

497. C. flaccosperma.

496. C. glaucodea.

498. C. granularis.

134. **C. flaccospérma** Dewey. Similar; *leaves slightly or scarcely glaucous, thinner; perigynia* 4.5–6 *mm. long*, 2–3 times exceeding the brownish scales. — Rich woods and swamps, N. C. to Mo., and southw. May, June. Fig. 497.

135. **C. granulàris** Muhl. Erect or spreading, 2.5–9 dm. high, *somewhat glaucous;* leaves flat, the basal 5–12 mm. wide; *bracts* broad and long, *much exceeding the culm; spikes* 2–4, scattered, all but the upper peduncled, erect or ascending, compact, short-ellipsoid to cylindric, 0.8–3 cm. long, 5–6 *mm. thick;* staminate spike small and usually sessile; *perigynia ovoid to globose*, 2–3.5 *mm.*

long, very strongly nerved, the nearly entire short *beak usually bent;* scale thin and pointed, about ½ the length of the perigynia.— Woods and meadows, Vt. to Ont., and southw. June, July. Fig. 498.

Var. **Haleàna** (Olney) Porter. Lower and more slender; pistillate *spikes* more slender, 3–5 *mm. thick; perigynia oblong.* (*C. Shriveri* Britton.) — Me. to Sask., s. to Va., O., Mich., and Wisc. Fig. 499.

499. C. gran., v. Haleana.

500. C. Crawei.

136. **C. Cràwei** Dewey. Low, strict, *stoloniferous*, 0.5–4 dm. high; leaves 2–4 mm. wide; *bracts scarcely exceeding the culm; spikes* 2–5, *scattered, the lowest radical or nearly so*, short-peduncled or the upper sessile, erect, compact, 1–2.7 cm. long; staminate spike generally peduncled; *perigynia* ovoid, *usually resinous-dotted*, nearly nerveless or few-nerved, very short-pointed, longer than the obtuse or short-pointed scale. — Moist places, in calcareous districts, Cape Breton I. to Man., locally s. to n. Me., n. Pa., the Great Lake region, and Kan. June, July. Fig. 500.

137. **C. exténsa** Good. Slender but *strict*, 3–8 dm. high; *leaves involute;* spikes 2–4, the lowest remote and short-peduncled, the remainder approximate and sessile, short (0.8–2.5 cm. long) and compact; perigynia ovoid, narrowed at the base, very strongly nerved, ascending, the *short stout beak* sharply toothed, longer than the blunt brown-edged scale. — Sandy shores, Long Island and Coney Island, N. Y.; Norfolk, Va. June–Aug. (Nat. from Eu.) Fig. 501.

501. C. extensa.

502. C. flava.

503. C. flava, v. rect.

138. **C. flàva** L. Tufted, 2–8 dm. high, *yellowish throughout; leaves flat*, 2–5 mm. wide, mostly shorter than the culms, *bracts* prominent, *divergent; pistillate spikes* 2–6, *aggregated, or the lowest distinct*, subglobose or short-cylindric, 0.8–1.5 cm. long; perigynia ovoid, yellow-brown, produced into a *long deflexed beak*, strongly nerved, *twice or thrice longer than the* blunt brown *scale.* — Damp places, Nfd. to Sask. and Alb., s. to Ct., n. N. J., w. Pa., Mich., Minn., and Mont. June–Sept. (Eu.) Fig. 502. — Hybridizes with *C. Oederi.*

Var. **rectiróstra** Gaudin. Low and slender; leaves 1–3 mm. wide; *the smaller straightish perigynia greenish or greenish-yellow.* (Var. *graminis* Bailey.) — Nfd. to R. I. and Mich. (Eu.) Fig. 503.

Var. **elàtior** Schlecht. *Pistillate spikes remote*, 6–9 mm. thick, the *curved perigynia* spreading or usually very retrorse. (*C. lepidocarpa* Tausch.) — Gaspé Co., Que., to R. I. and N. Y. (Eu.) Fig. 504.

504. C. flava, v. elatior.

505. C. Oederi.

139. **C. Oedèri** Retz. Similar, *plant greenish*, 0.5–3 dm. high; leaves 1–3 mm. wide; *pistillate spikes* 2–4, *mostly scattered*, 5–15 mm. long, 4–8 mm. thick; the plump *greenish-brown short-beaked perigynia ascending or wide-spreading*, ½ *longer than the obtuse scale.* — Bogs, meadows and shores, Nfd. to Hudson Bay and Me. June–Aug. (Eu.) Fig. 505. — Hybridizes with *C. flava.*

506. C. Oederi, v. pumila.

Var. **pùmila** (Cosson & Germain) Fernald. Plant 0.5–6 dm high; *pistillate spikes* 3–10, *mostly crowded.* (*C. viridula* Michx.; *C. flava*, var. *viridula* Bailey.) — Nfd. to B. C., s. to N. E., Pa., O., Ind., etc. (Eu.) Fig. 506.

507. C. assiniboinensis.

140. **C. assiniboinénsis** W. Boott. Tufted, slender, 4.5–9 dm. high, *purplish-brown at base;* leaves 2–3 mm. wide, the bracts short, rarely prolonged; staminate spike long-stalked, 2–3 cm. long; *pistillate spikes* 2, very remote, peduncled, *with 3–6 remote alternate flowers; perigynia* 5–6.5 mm. long, *lance-subulate*, about equaling the scales. — Damp thickets and gravelly shores, Man. and n. Minn. June. Fig. 507.

508. C. longirostris.

141. **C. longiróstris** Torr. Slender but erect, 0.3–1 m. high, growing in stools, the *base dull brown* and *retaining coarse shreddy tufts;* leaves 3–4 mm. wide, flat, loose; staminate spikes 1–4, peduncled; *pistillate spikes* 2–5, 1–5 cm. long, *loosely flowered*, slender-peduncled and mostly drooping; *perigynia* thin, slightly inflated, green, spreading, *about the length of the awned scales.* — Rocky woods or dry alluvial thickets, N. B. to Sask., N. J., Pa., and Neb., local. May–July. Fig. 508.

509. C. cherokeensis.

142. **C. cherokeénsis** Schwein. Rather slender, 2–7 dm high, the *base castaneous;* leaves flat, the basal 3–6 mm. broad; *staminate spikes* 2–4, *whitish; pistillate* 2–10, *remote, often in 2's or 3's*, 1.5–5 cm. long; *perigynia* conic-ovoid, pale green or straw-color, prominently few-ribbed, *slightly exceeding the broad pale scales.* — Woods and river swamps, Ga. and Fla. to Tex.; northw. in the flat country to Mo. April, May. Fig. 509.

143. **C. castànea** Wahlenb. Slender but erect, 3–9 dm. high; *leaves*, 3–6 mm. broad, flat, *hairy*, much shorter than the rough culm; staminate spike 0.7–2 mm. long, very short-peduncled; *pistillate spikes* 2–5, *approximate*, widely spreading or drooping on filiform stalks, 0.8–2.5 cm. long, rather dense, tawny; perigynia narrowly conic, the beak ½ as long as the body, thin, with a nerve on each side, longer than the *brown acute thin scales.* — Alluvial woods and thickets, rarely in bogs, in calcareous districts, Nfd. to Ont., locally s. to Ct., N.Y., and the Great Lake region. May–July. Fig. 510. — Hybridizes with *C. arctata.*

510. C. castanea.

144. **C. capillàris** L. *Densely tufted, very slender* but erect, 0.3–2.5 *dm. high;* culm smooth, longer than the narrow flat or at length involute leaves; *spikes* 2–4, *approximate, the lowest rarely* 2 *cm. apart, all* more or less long-peduncled and *drooping*, borne in the axils of sheathing bracts, *very small* (3–12-*flowered*); *perigynium thin, very small*, oblong-obovoid, the beak hyaline-lipped, *longer than the very obtuse white scale.* — Alpine or subalpine regions, Mt. Kineo, Me.; Mt. Washington, N. H.; and high northw. July, Aug. (Eu.) Fig. 511.

511. C. capillaris.

Var. **elongàta** Olney. *Loose and tall* (1.5–8 *dm.*); *the spikes remote, the lowest* 2.5–10 *cm.*

apart. — Wet rocks and mossy woods, in calcareous regions, Nfd. to Alaska, southw. to s. N. B., Me., N. Y., Mich., Col., etc. June, July.

145. **C. arctàta** Boott. Slender, erect, 2.5–10 dm. high; *radical leaves much shorter than the culm* and very broad, flat; bracts broad and short, long-sheathing; spikes 3–5, usually spreading or drooping on filiform stalks, 1.5–8 cm. long, slender; *perigynia* 3.5–4.5 *mm. long, abruptly and conspicuously stipitate* and abruptly contracted into a beak, *3-cornered, prominently few-nerved, green, mostly spreading, slightly longer than the very sharp or cuspidate scale.* (Including var. *Faxoni* Bailey, which was based on pathological material.) — Woods and copses, e. Que. to Ont., s. to Pa., Mich., and Minn. June–Aug. Fig. 512. — Hybridizes with *C. castanea* and *C. virescens.*

512. C. arctata.

513. C. debilis.

146. **C. débilis** Michx. Resembling the last; very *slender and lax*, 0.3–1.2 m. high; leaves narrow and lax; spikes 3 or 4, the upper approximate, the lower remote, mostly overtopped by the leafy bracts, slender-pediceled and flexuous, 3–6 cm. long; *perigynia soft and thin, 6–9 mm. long, faintly nerved or nerveless, the white-edged scales blunt.* — Woods and copses, D. C. to Fla. and Tex. May, June. Fig. 513.

Var. **Rúdgei** Bailey. Culms 0.1–1 m. high; spikes 1.5–6 cm. long; *perigynia* 4.5–6 *mm. long, rusty when ripe, appressed, twice longer than the tawny scales.* (*C. tenuis* Rudge.) — Open woods, thickets and meadows, Nfd. to Wisc., s. to N. C. June–Aug. Fig. 514. — Hybridizes with *C. virescens.* Var. STRÍCTIOR Bailey. Usually tall, *strict; leaves broader and firmer; spikes stiffer, simply spreading or even erect; perigynia mostly shorter and greener, often little exceeding the scales.* — White Mts., N. H.

514. C. deb., v. Rudgei.

Var. **interjécta** Bailey. *Perigynia* firmer, more trigonous, *scattered; the alternate-flowered spikes* 4–8 cm. long. — Ct. to O. and n. N. J., local.

Var. **pùbera** Gray. *Perigynia* usually more slender, more nerved and *minutely pubescent.* — Pa. to N. C., local.

147. **C. venústa** Dewey, var. **minor** Boeckl. Slender but strict, 3–8 dm. high; *basal leaves* 4–12 *mm. wide, strict,* the upper and the bracts about as long as the culm; *spikes* 2–5, the upper pistillate ones approximate, *usually ascending,* the terminal sometimes staminate at top, 1.5–5 cm. long; *perigynia* ascending, 5.5–8 mm. long, *firm, prominently nerved, the very short and stout beak prominently toothed, thrice longer than the* rusty narrow *scale.* (*C. oblita* Steud.) — Sphagnous swamps and low woods, N. Y. and N. J., southw., local. June. Fig. 515.

515. C. ven., v. minor.

516. C. verrucosa.

148. **C. verrucòsa** Muhl. *Glaucous, stout and stiff,* 0.6–1.5 m. high; *leaves* long, *rough-angled, becoming revolute;* spikes 3–10, 2–6 cm. long, 6–9 mm. thick, scattered to loosely aggregated, ascending or pendulous, often somewhat staminate above, variously peduncled; scales thin, brown, emarginate, shorter than the *ovoid glaucous perigynia,* but the hispid *awn from* 2–3 *times longer to nearly obsolete;* beak short, entire. — Swamps and wet shores, Va., Mo., and southw. July–Sept. Fig. 516.

149. **C. macrokòlea** Steud. Similar, *slender,* 4–7 dm. high; spikes 2–5, 1.5–4 cm. long, ascending, on slender peduncles; scales lanceolate to ovate,

517. C. macrokolea.

short-awned, exceeded by the plump subglobose or obovoid *strongly ribbed abruptly beaked perigynia.* (*C. Joorii* Bailey.) — Swamps and wet shores, Mo. to Fla. and Tex. Aug. FIG. 517.

150. C. scabràta Schwein. Rather stout, *very leafy*, 2–8 dm. high; *culm sharply and very roughly angled; leaves* 6–18 *mm. broad, flat, very rough;* spikes 3–6, scattered, the upper 1 or 2 sessile, the remainder often long-peduncled and sometimes nodding, 1–6 cm. long, narrowly cylindrical and compactly flowered; *perigynia* broadly ovoid, *prominently few-nerved, rough, the beak nearly as long as the body and slightly toothed; scales acute and rough-tipped*, green-nerved, about as long as the body of the perigynia. — Wet meadows and glades, e. Que. to Ont., s. to the mts. of S. C. and Tenn., O., and Mich. June–Aug. FIG. 518. — Hybridizes with *C. crinita.*

518. C. scabrata.

151. C. filifórmis L. *Tall and very slender* but erect, 0.5–1.2 m. high; *culm obtuse, smooth; leaves very long, involute-filiform*, rough; *spikes* 1–3, *sessile*, somewhat scattered, erect, short and thick, 1–5 cm. long, 5–7 mm. thick; *perigynia very short-ovoid*, the teeth very short, *the few nerves obscured by the dense stiff hairs; scales thin and blunt*, about as long as the perigynia. — Bogs and shallow water, Nfd. to B. C., s. to Pa. and the Great Lake region. May–Aug. (Eu.) FIG. 519.

519. C. filiformis.

520. C. Houghtonii.

152. C. lanuginòsa Michx. Similar; lower; *culm mostly rough above; leaves flat*, 2–5 mm. broad; *spikes* usually somewhat slimmer, the *lowest usually peduncled; scales mostly sharper and longer.* (*C. filiformis*, var. *latifolia* Boeckl.) — Swales and low meadows, N. B. to Sask. and B. C., s. to Pa., Ill., Kan., etc. June–July.

153. C. Houghtònii Torr. *Stiff*, 1.5–6.5 dm. high, *extensively creeping; culm rather sharply angled, rough*, exceeding the leaves; *leaves flat* and very sharp-pointed; *spikes* 1–3, sessile or the lowest short-stalked, erect, varying from nearly globular to cylindric, 1–4.5 cm. long, 7–12 *mm. thick*, compact; *perigynia* short-ovoid, *stiffly pubescent*, prominently nerved and toothed; *scales thin-margined, acute or awned.* — Dry sandy or gravelly soil, e. Que. to Athabasca, s. to n. N. E., N. Y., Mich., and Minn. May–Aug. FIG. 520.

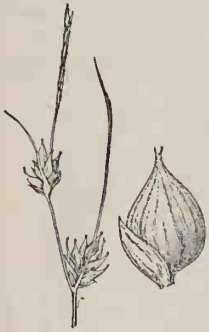
521. C. vestita.

154. C. vestita Willd. Stout and *stiff*, 3–8 dm. high, *freely stoloniferous; culm sharply angled*, smooth or somewhat rough; *leaves narrow* and rather short, roughish; *staminate spike* 1, rarely 2, sessile or nearly so, 2–5 *cm. long;* pistillate spikes 1–3, subapproximate, or rarely the lowest subradical, often staminate at top, ellipsoid or short-cylindric, 0.8–2.8 cm. long, compactly flowered; *perigynia* ovoid, nerved, *stiffly hairy*, short-beaked, the *beak* often purple and *white-hyaline at the orifice, which becomes more or less split with age;* scales thin and blunt or acute, shorter

than the perigynia. — In sandy soils, from s. Me. to e. N. Y., and D. C.; "south to Ga." May–July. Fig. 521. Var. Kennédyi Fernald. *Staminate spike about 1 cm. long, hidden by the pistillate.* — Wilmington, Mass. (*Kennedy*).

155. **C. striàta** Michx., var. **brèvis** Bailey. Stiff, 3–8 dm. high, *extensively creeping;* culm sharply angled, smooth or slightly rough above, mostly exceeding the leaves; *leaves* narrow and *stiff, becoming involute; spikes* 1–2, mostly closely sessile, considerably separated when two, short (1–5 *cm. long*) and rather thick, erect; *perigynia broad-ovoid with impressed nerves, smooth,* ascending, short-beaked and very short-toothed; scales thin, obtuse or acutish, mostly about ½ as long as the perigynia. (*C. Walteriana*, var. Bailey.) — Pine-barren swamps, s. e. Mass., southw., local. June–Aug. Fig. 522.

522. C. striata, v. brev.



523. C. oligosperma.

156. **C. oligospérma** Michx. Very slender, but stiff, 2.5–9 dm. high; culms solitary or few from a *slender stoloniferous base; leaves and bracts very narrow, becoming involute;* staminate spike peduncled; *pistillate spikes* 1 or 2, rarely 3, sessile or the lowest very short-peduncled, *globular or short-oblong* (0.7–2 *cm. long*) *few-flowered;* perigynia turgid, *shining,* gradually contracted into a very short and minutely toothed beak, *prominently few-nerved,* yellowish, nearly twice longer than the blunt scales. — Bogs and wet shores, Lab. and Nfd. to the Mackenzie, s. to Pa., and the Great Lake region. June–Aug. Fig. 523.

157. **C. hirta** L. Variable in size (2–6 dm. high), *widely creeping; culm* rather slender but erect, *obtuse* and smooth or slightly rough above; leaves soft and flat, generally sparsely hairy and the sheaths very hirsute, rarely smooth; spikes 2–3, distant, more or less shortly peduncled, erect or nearly so, 1.5–4 cm. long, rather loose; perigynia long-ovoid, nerved, soft-hairy, the prominent beak slender-toothed; *scales thin* and green-nerved, *awned,* mostly a little shorter. — Groves, fields, and made-lands, e. Mass. to centr. N. Y. and Pa.; local. June–Aug. (Nat. from Eu.) Fig. 524.

524. C. hirta.

525. C. trichocarpa.

158. **C. trichocárpa** Muhl. Stout and tall, 0.6–1.2 m. high; *culm sharply angled,* rough above; *leaves* numerous, flat, 3–6 mm. wide, very rough, but *not hairy,* much exceeding the culm; spikes 2–5, scattered, the lower stalked and more or less spreading, 3–8 cm. long, 1–1.5 cm. thick, heavy, but loosely flowered at base; *perigynia ovoid, many-costate, sparsely short-hairy,* about twice as long as the membranaceous, acute or acuminate scales. — Marshes, s. w. Vt. to Ont., s. to Pa. and Ill. June–Aug. Fig. 525. Var. turbinàta Dewey. Spikes 2–2.5 cm. long, 1.3–1.8 cm. thick; perigynia lance-subulate. — Dutchess Co., N. Y.

Var. Dewèyi Bailey. Leaves narrower, often becoming somewhat involute, smoother; spikes short, 1.5–5 cm. long, all but the lowest one sessile; *perigynia*

smooth, thick in texture, becoming polished with age, the *nerves impressed*; scales sharp, mostly a little shorter than the perigynia. — Ia. to Kan., and northwestw. Fig. 526.

526. C. trich., v. Deweyi.

Var. **aristàta** (R. Br.) Bailey. Mostly stouter; *leaves* 4–10 mm. wide, *more or less hairy on the under surface and sheaths; perigynia lance-ovoid, smooth*, the teeth longer and more spreading; scales long and sharp. (*C. aristata* R. Br.) — Ont. to Sask. and B. C., s. to N. Y., Mich., Wisc., Neb., etc. Fig. 527. Var. IMBÈRBIS Gray. *Sheaths glabrous.* — Ont. to N. Dak. and Mo.

527. C. trich., v. aristata.

159. **C. ripària** W. Curtis. *Very large and stout*, 0.6–1.3 m. high, stoloniferous; *leaves* 0.5–1.5 cm. broad, flat, rough, *glaucous*, much longer than the sharply angled culm; spikes 2–4, scattered and all more or less peduncled, the lowest often very long-stalked, varying from almost globular to slender-cylindric, 2–10 cm. long, erect or the lower somewhat drooping, loosely flowered below; *perigynia lance-ovoid, coriaceous, rather lightly many-nerved, the beak short and thick;* scales varying from blunt to awned, shorter or longer than the perigynia. — Swamps and wet shores, N. B. to Man., and southw. May–July. (Eu.) Fig. 528.

528. C. riparia.

160. **C. ACUTIFÓRMIS** Ehrh. Stout, 0.4–1.2 m. high; culm thick and sharp, mostly smooth; *leaves* broad, flat and *glaucous*, much prolonged; spikes 2–5, all but the uppermost peduncled, spreading or drooping, narrowly cylindric, 2–5.5 cm. long, loosely flowered below; *perigynia ovoid, very strongly many-nerved*, the short beak slightly toothed; scales rough-awned and longer than the perigynia. — Boggy meadow, New Bedford, and formerly at Dorchester, Mass. June, July. (Nat. from Eu.) Fig. 529.

529. C. acutiformis.

530. C. squarrosa.

161. **C. squarròsa** L. Caespitose, 3–9 dm. high; *culm sharply angled*, more or less rough above; *leaves* 2.5–6 *mm. broad*, weak, roughish, exceeding the culm; bracts slender, elongate; spikes 1–4, thick, the terminal always two thirds pistillate or more, the remainder more or less stalked, erect or slightly nodding, globular or short-cylindric, 1.5–3 cm. long, 1.5–2 cm. thick, brown, exceedingly densely flowered; *perigynia squarrose*, the beak rough; scale short and usually hidden. — Swamps and wet woods, w. N. E. to Neb., and southw., local. June–Sept. Fig. 530.

531. C. typhinoides.

162. **C. typhinoìdes** Schwein. Coarser, the *glaucous or pale leaves* 0.5–1 *cm. broad;* spikes 1.5–5 cm. long, 1–2.2 cm. thick, pale brown; perigynia less squarrose, the *beaks ascending.* — Meadows and alluvial woods, w. Que. and w. N. E. to Ia. and southw. June–Oct. Fig. 531.

163. **C. Fránkii** Kunth. Stout and very leafy, 5–8 dm. high; *culm obtusely angled*, very smooth; leaves 4–9 mm. broad, rough on the nerves, the upper and the bracts very much longer than the culm; terminal spike often pistillate at top; other *spikes* 3–7, the uppermost sessile *on the*

532. C. Frankii.

zigzag rhachis, 1.5–4 cm. long, 1 cm. thick, *evenly cylindrical*, often staminate at top; *perigynia very abruptly contracted into a* short but slender toothed *beak*. (*C. stenolepis* Torr.) — Swamps and meadows, Pa. to Ill. and southw. June–Sept. Fig. 532.

533. C. Pseudo-Cyperus.

164. **C. Pseùdo-Cypèrus** L. Tall and rather stout, 0.5–1 m. high, in clumps; culm thick and very sharply triangular, rough throughout; leaves very long, rough-margined, 0.5–1 cm. wide; *spikes* 3–5, slenderly peduncled and more or less drooping, somewhat contiguous, 2.5–7.5 cm. long, *narrowly cylindrical* (8–11 *mm. thick*), *very compactly flowered;* perigynia strongly reflexed, more or less 2-edged, many-costate, the *beak shorter than the body, with erect short* (0.5–1 *mm. long*) *teeth;* scales very rough-awned, about the length of the perigynia. — Bogs and shallow water, Gulf of St. Lawrence to Sask., locally s. to Ct., centr. N. Y. and the Great Lakes. June–Aug. (Eu.) Fig. 533.

534. C. comosa.

165. **C. comòsa** Boott. Mostly *stouter* (0.5–1.5 m. high), the *leaves broader* (6–16 mm. wide); *spikes* 1.3–1.7 *cm. thick, more loosely flowered;* perigynia longer, the *beak mostly longer than the body* and the *teeth long* (1.2–2 *mm.*) *and spreading*. (*C. Pseudo-Cyperus*, var. *americana* Hochst.) — Swamps, N. S. to Wash., s. to Fla., La., and s. Cal. June–Aug. Fig. 534.

535. C. hystericina.

166. **C. hystericìna** Muhl. Slender but erect, 2.5–1 m. high; culm very sharply angled and rough, at least above: leaves 3–10 mm. broad, roughish; *spikes* 2–5, borne near the top of the culm, rarely very remote, the upper often sessile, the remainder on more or less filiform stalks, spreading or drooping, 1.5–6 cm. long, 1–1.5 *cm. thick*, compactly flowered; *perigynia greenish or straw-colored, strongly* 15–20-*nerved*, the very slender beak strongly toothed; scale nearly or quite as long as the perigynium. — Swales, throughout; frequent. June–Aug. (Jamaica). Fig. 535. — Tall specimens with long pendulous spikes have been separated as the scarcely distinguishable var. Coolèyi Dewey (var. *Dudleyi* Bailey).

536. C. lurida.

167. **C. lùrida** Wahlenb. Variable in size, 0.2–1 m. high, stout; culm rather obtusely angled and smooth; *leaves* long and loose, 4–6 *mm. wide*, rough, the bracts leafy, elongated; *spikes* 2–4, variously disposed, the 1 or 2 upper sessile, nearly erect or often drooping, the others more or less peduncled, approximate or remote, very densely flowered, globose to thick-cylindric, 1.5–6 cm. long, 1.5–2 *cm. thick; perigynia* thin and turgid, somewhat shining, *about* 10-*nerved*, the body barely equaling the slender long-conic beak; staminate spike single; scales linear, half as long as the perigynia or more. — Swamps and wet woods, N. S. to Ont., and southw.

abundant eastw. FIG. 536. — Hybridizes with *C. lupulina*. Very variable, passing to many scarcely distinguishable forms, and to

537. C. lur., v. grac.

Var. **grácilis** (Boott) Bailey. Slender, 3–7 dm. high; *leaves 2–3 mm. wide; spikes* 1–4 cm. long, 1–1.3 *cm. thick.* (*C. Baileyi* Britton). — Cool woods and meadows, Me. to w. N. Y., and in the mts. to Tenn., local. FIG. 537.

168. **C. Schweinítzii** Dewey. Soft but erect, 2.5–7 dm. high, *yellowish-green*, becoming straw-colored in drying; *culm solitary, from creeping rootstock, flattish* and smooth; *leaves* 0.5–1 *cm. broad*, the radical longer than the culm, the others mostly short; spikes 3–5, the lower one or two short-peduncled, the others subsessile and approximate, *narrowly long-cylindrical* (2.5–7.5 cm. long, 8–13 mm. thick), ascending; perigynia thin and somewhat inflated, few-nerved, the long beak short-toothed, ascending; scales awned and commonly rough at the tip, a little shorter than the perigynia. — Swamps and wet calcareous soil, s. Vt. to Ont., s. to Ct., n. N. J., and Mich. June, July. FIG. 538.

538. C. Schweinitzii.

169. **C. retrórsa** Schwein. Stout, 0.4–1 m. high; culm obtusely angled and smooth or nearly so; leaves and bracts 0.4–1 cm. broad, soft, roughish, much longer than the culm; *staminate spikes* 1–4, *sessile or short-peduncled; pistillate spikes* 3–8, *approximate* near the top of the culm or the lowest remote, *all but the lowest* 1 *or* 2 *sessile or subsessile*, 1.5–5 cm. long, 1.7–2 cm. thick, compactly flowered, *erect or spreading; perigynia* very thin and papery, much inflated, prominently nerved, *strongly reflexed*, conic-ovoid, long-beaked, 8–10 mm. long, much exceeding the acuminate scales. — Wet places, e. Que. to the Saskatchewan and B. C., s. to Pa., the Great Lakes, Ia., Ida., and Ore. July–Oct. FIG. 539. — Hybridizes with *C. rostrata*. Var. ROBINSÒNII Fernald. Spikes slender, 1.2–1.5 cm. thick. — Local, Me. to Ida.

539. C. retrorsa.

Var. **Hártii** (Dewey) Gray. The *remote, often long-peduncled spikes* usually more slender, 2–8 cm. long; *perigynia wide-spreading.* — Local, N. H. to Ont. and Mich.

Var. **Macoúnii** (Dewey) Fernald. Similar to the last, but *perigynia ascending.* (*C. lupulina* × *retrorsa* Dudley.) — N. Y., Ont., and Mich.

540. C. Halei.

170. **C. Hàlei** Carey. *Culms solitary, slender*, smooth, 2–6 dm. high; *leaves* and bracts soft, roughish, 3–6 *mm. broad*, over-topping the inflorescence; *staminate spike long-peduncled; pistillate* 2–4, mostly *scattered, sessile, or the lowest short-peduncled, short-cylindric to subglobose*, 2–3.5 cm. long, 2–2.5 cm. thick; the rather *few perigynia* conic-ovoid, thin, bladdery, 10–12 mm. long, with a rather abrupt slender-conic beak, twice as long as the firm ovate acuminate scales. (*C. louisianica* Bailey.) — Swamps, Fla. to Tex., northw. in the lowlands to Mo. June–Aug. FIG. 540.

171. **C. gigantèa** Rudge. *Loosely caespitose* or somewhat stoloniferous, *stout*, 0.5–1.2 m. high; *leaves* 0.7–1.5 *cm. broad;* staminate spikes 2–4; *pistillate* 2–4, *scattered, the lowest long-peduncled and remote*, rather loosely flowered, 3–7 cm. long, 2–2.7 cm. thick; *perigynia* swollen below but very *abruptly contracted into a slender beak* 3–4 *times as long as the body, spreading at right angles or nearly so*, never becoming yellow; scales narrow, smooth. (*C. grandis* Bailey.) — Swamps, Del., Ky., and Mo., southw. July–Sept. Fig. 541.

541. C. gigantea.

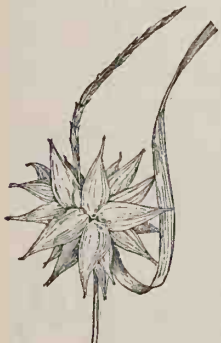
542. C. lupuliformis.

172. **C. lupulifórmis** Sartwel. Stout, tall, 0.6–1.2 m. high; leaves 0.6–1.3 cm. broad, conspicuously elongate bracts broad and far exceeding the culm; *staminate spike usually peduncled; pistillate spikes* 3–5, 3–8 cm. long, *cylindrical* (2–3.5 cm. thick), at least the lower *peduncled*, erect or ascending, somewhat scattered or the upper approximate, *becoming yellowish brown;* perigynia narrowly conic-ovoid, 1.3–2 cm. long, mostly twice exceeding the firm lance-attenuate scales, ascending. (*C. lupulina*, var. *polystachya* Schwein. & Torr.) — Rich swamps, meadows, and prairies, Vt. to Minn., s. to Del., Ill., and La. July–Oct. Fig. 542.

173. **C. lupulìna** Muhl. Very stout and leafy, 4–9 dm. high; leaves 0.6–1 cm. broad, loose; *bracts broad and elongate; pistillate spikes* 2–6, *approximate at the top of the culm*, all closely sessile or the lower sometimes short-peduncled, thick-cylindrical to subglobose, *very heavy and densely flowered*, 3–6 *cm. long*, 2–3 *cm. thick; staminate spike sessile; perigynia* much inflated, rather soft, 1.3–2 cm. long, *erect or but slightly spreading*, giving the spike a hop-like aspect (whence the name); scales firm, lance-ovate, mostly much shorter than the perigynia. — Swamps and wet woods N. B., to Ont., Ia., and southw. July–Oct. Fig. 543. — Frequently hybridizes with other species.

543. C. lupulina.

Var. **pedunculàta** Dewey. Often taller; *spikes more or less scattered*, some or all *prominently peduncled; staminate spike* usually conspicuous, *generally peduncled;* perigynia more spreading. — Locally more abundant.



544. C. Grayii.

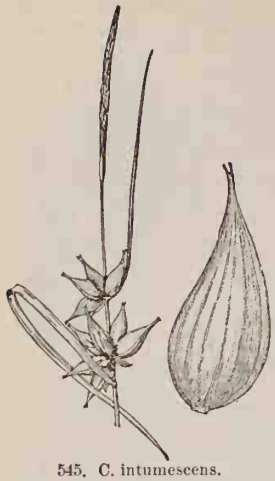
174. **C. Gràyii** Carey. Rather *stout*, 0.3–1 m. high; *leaves* 6–11 *mm. wide*, flat, *harsh, pale green;* pistillate spikes 1 or 2, the lowest often peduncled, *perfectly globular* and compactly 6–30-flowered, the *perigynia firm*, much inflated, *glabrous*, 1.5–2 *cm. long*, spreading or deflexed and prominently many-nerved. (*C. Asa-Grayi* Bailey.) — Wet alluvial woods and meadows, w. N. E. to Ont., Ia., and Mo., local. June–Oct. Fig. 544.

Var. **hispídula** Gray. *Perigynia hispidulous* — Ct. to Mo., and southw.

175. **C. intuméscens** Rudge. *Slender*, 0.3–1 m. high; *leaves and bracts* 3–8 *mm. wide, soft*, much elongate, *dark green;* pistillate spikes 1–3, subglobose or short-ovoid, loosely 1–12-flowered; the *perigynia thin*, bladdery, green, 1–1.5 *cm. long*, 5–8 *mm. thick*, spreading, many-nerved. — Swamps, meadows, and alluvial woods, throughout; the typical

form commonest from Mass. southw. June–Sept Fig. 545.

Var. **Fernáldii** Bailey. *Perigynia more slender*, less inflated, 1.2–1.7 *cm. long*, 3–5 *mm. thick.* — Nfd. to Man., s. to Mass., N. Y., Mich., and Wisc.; and on the mts. of N. C.; the common form northw.



545. C. intumescens.

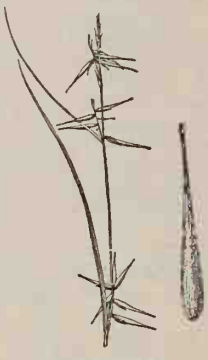
176. **C. folliculàta** L. Rather slender, 0.3–1.2 m. high; *leaves very broad and flat, yellowish-green, lax; pistillate spikes* 2–5, *mostly scattered, all but the uppermost prominently peduncled; perigynia* conic-subulate, very *slightly inflated*, many-nerved, 1–1.5 cm. long; *scales awned* and often nearly as long. — Wet woods, meadows and bogs, Nfd. to Ont., s. to Md., W. Va., and Mich.; locally abundant. June–Aug. Fig. 546.

546. C. folliculata.

177. **C. Michauxiàna** Boeckl. Slender but *stiff and erect*, 2.5–6 dm. high, yellowish; *leaves narrow and firm*, shorter than the culm; *spikes* 2–4, the lowest usually remote and short-peduncled, the *remainder aggregated and sessile; perigynia* lance-subulate, *not inflated*, 8–13 mm. long, erect or spreading, twice longer than the *blunt scales.* (*C. abacta* Bailey.) — Bogs and lake-borders, Nfd. to L. Mistassini, s. to n. N. E., n. N. Y., and Mich.; local. June, July. Fig. 547.

547. C. Michauxiana.

178. **C. subulàta** Michx. *Green*, very slender but erect, 1.5–6 dm. high; *leaves soft*, 1.5–4 mm. wide, shorter than the culm; bracts leafy, sheathing; *pistillate spikes* 2–5, *scattered*, 2–6-*flowered; perigynia subulate*, 1–1.5 cm. long, *deflexed.* (*C. Collinsii* Nutt.) — Bogs and white cedar swamps, R. I. to e. Pa., and southw.; very local. June, July. Fig. 548.



548. C. subulata.

179. **C. saxátilis** L. Low, 2–3 dm. high; *leaves* 2–5 *mm. wide, flat, becoming involute*, nearly or quite equaling the culm; staminate spike 1 (rarely 2); *pistillate* 1–3, sessile or short-peduncled, *subglobose or short-cylindric*, 0.5–2 cm. long, 5–8 mm. thick; *perigynia purple or purple-tinged, usually nerveless*, ovoid, 3–4 mm. long, with a short subentire beak, slightly exceeding the *blunt purple scale;* stigmas usually 2. — By an alpine pond, Mt. Katahdin, Me.; Lab. and Greenl. July, Aug. (Eu.) Fig. 549.

550. C. saxa., v. miliaris.

Var. **miliàris** (Michx.) Bailey. Slender and taller, 2.5–6 dm. high; *leaves nearly filiform; pistillate spikes* mostly *paler* and *more slender*, 1–2.5 cm. long, 3–7 mm. thick. (*C. miliaris* Michx.) — Margins of rivers and lakes, Nfd. to Hudson Bay, locally s. to

549. C. saxatilis.

6. N. B. and centr. Mc. July–Sept. Fig. 550. — Apparently hybridizes with *C. vesicaria*.

180. **C. Grahàmi** Boott. Slender, 2–7 dm. high; *leaves flat*, 1.5–3 mm. wide; staminate spikes 1–3; *pistillate* 1–3, *the lowest mostly short-peduncled*, slightly spreading or ascending, 1.2–1.8 cm. long, 6–10 mm. thick; *perigynia* straw-colored, thin, ovoid, 4–5 mm. long, *few-nerved*, with a slender subentire beak, *ascending*, twice as long as the blunt purple scale. — Margin of a pond, Mt. Katahdin, Me. July, Aug. (Scotland.) Fig. 551. — Much of the American material previously referred to this species is apparently a hybrid between *C. saxatilis*, var. *miliaris* and forms of *C. vesicaria*. (*C. miliaris*, var. *aurea* Bailey; *C. Raeana* Britton, not Boott; *C. maineensis* Porter.)

552. C. rotundata.

551. C. Grahami.

181. **C. rotundàta** Wahlenb. Slender, 6 dm. or less high; *leaves* soon *becoming involute*; staminate spike 1 (rarely 2 or 3); *pistillate* 1 or 2, *sessile*, short and compact, 8–13 mm. long, 6–8 mm. thick, *the lower subtended by a divergent bract* (4–5 *cm. long*); *perigynia* pale or ferruginous, plump, subglobose-ovoid, *few-nerved*, about 3 mm. long, abruptly short-beaked, the beak entire or short-toothed, one half longer than the purplish scales. — Outlet of Moosehead L., Me. Aug. (Greenl., n. Eu.) Fig. 552.

182. **C. vesicària** L. Comparatively *slender*, 0.4–1 m. high; the *culms sharply angled and generally harsh above*, usually overtopped by the bracts; leaves 4–7 mm. wide, loosely ascending or spreading; staminate spikes mostly 2 or 3, peduncled; *pistillate spikes* 2–3, remote, sessile or short-peduncled, *cylindric*, 2–7 *cm. long*, 1–1.5 *cm. thick*; *perigynia slightly turgid*, *ovoid to oblong-conic*, *gradually tapering to the beak*, when mature 7–9 mm. long, twice exceeding the ovate-lanceolate *acute or acuminate scales*. — Meadows and low ground, e. Que. to B. C., s. to Pa., the Great Lake region, etc. June–Aug. (Eu.) Fig. 553. — A very variable northern species, passing freely with us into the following arbitrarily distinguished tendencies. Var. MONÌLE (Tuckerm.) Fernald. Leaves 2–5 mm. wide; pistillate spikes as in the species; *perigynia more turgid*, *roundish-ovoid*, *about* 6 *mm. long*, *rather abruptly tapering to the beak*. (*C. monile* Tuckerm.) — Nfd. to Sask., Ky., and Mo., generally common. Fig. 554. Var. JEJÙNA Fernald. Smaller and *more slender*; *pistillate spikes thinner*, 5–8 *mm. thick*. — Common northw. Var. DISTÉNTA Fries. Slender; pistillate *spikes* 1 *or* 2, *short and thick*, 1–2.5 *cm. long*, 1–1.5 *cm. thick*; *perigynia* subglobose or ovoid, *abruptly beaked*. — Local, Nfd. and Que. to Me. and Vt. Var. RAEÀNA (Boott) Fernald. Very slender; *leaves* 2 *mm. wide*, *tending to become involute at tip*; pistillate *spikes slender*, 4–8 *mm. thick*; *perigynia scarcely inflated*, narrow and elongate. — Local, Que. to Athabasca, s. to Me. Fig. 555.

554. C. ves., v. monile.

553. C. vesicaria.

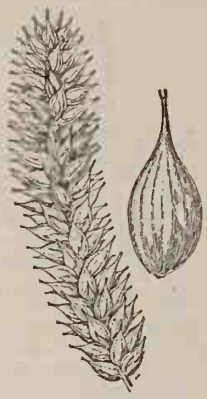
555. C. ves., v. Raeana.

183. **C. rostràta** Stokes. *Culm* 0.3–1 m. high, rather *stout*, thickish and spongy at base, generally smooth and bluntly angled above; *leaves* elongated, flat, usually equaling or exceeding the culms, *pale green or glaucous*, 0.2–1 cm. wide, prominently nodulose, especially after drying; *staminate inflorescence peduncled*, *of* 2–4 *distinct spikes*, pistillate *spikes* mostly 2–4, sessile or the lower peduncled, *cylindric*, *dense*.

2–10 cm. long, 6–12 *mm. thick; perigynia* ascending or slightly spreading, *flask-shaped*, 3–6 mm. long, *the abrupt cylindric beak* somewhat exceeding the bluntish or acute oblong or lanceolate purple-tinged scale. (*C. utriculata*, var. *minor* Boott.) — Wet swamps and shallow water, Nfd. and Lab. to Sask. and B. C., s. to Ct., N. Y., Ill., Utah, and Cal.; common northw., local southw. (Eu.) Fig. 556.

556. C. rostrata.

Var. **utriculàta** (Boott) Bailey. *Coarser;* mature *spikes* 1–2 *cm. thick*, often longer than in the species; *perigynia ellipsoid-ovoid to conic-cylindric*, 0.5–1 cm. long, *tapering gradually to the beak.* (*C. utriculata* Boott.) — Extending s. to N. J., O., etc. Fig. 557.


557. C. rost., v. utric.

Var. **ámbigens** Fernald. *Very slender*, 3–5 dm. high; culms barely 1 mm. in diameter below the spikes; leaves 2–5 mm. broad; *staminate spikes* 1 *or* 2; *pistillate* 1–3, 1–2.5 *cm. long;* perigynia as in the species. — Que., N. B., and n. Me.

558. C. bullata.

184. **C. bullàta** Schkuhr. Slender, 4–9 dm. high, the long stiff *leaves* 4–6 *mm. wide;* staminate spikes mostly 2 or 3, long-peduncled; *pistillate spikes mostly* 2, *remote, cylindric*, densely flowered, 2.5–5 cm. long, 1–1.5 cm. thick; *perigynia* strongly nerved, *firm*, dull or slightly shining, very turgid, 5–8 mm. long, spreading-ascending, the usually *serrulate or slightly roughish* conic-cylindric *beak* much exceeding the acute or bluntish scale. (*C. Olneyi* Boott; *C. bullata* × *utriculata* Bailey.) — Swales and wet meadows, local, Mass. to Del. June, July. Fig. 558.

559. C. bullata, v. Greenii.

Var. **Greènii** (Boeckl.) Fernald. More slender and lower; *leaves* 2–4 *mm. wide; pistillate spike* 1 (*or if* 2, *remote*), *shorter and thicker*, rather loosely flowered; perigynia lustrous, 6–9 mm. long. (*C. bullata* Man. ed. 6.) — Commoner, s. Me. to Pa. and Ga. Fig. 559.

185. **C. Tuckermàni** Dewey. Culms slender, 1 m. or less high, forming loose stools; leaves 3–5 mm. wide; bracts very leaf-like and usually much prolonged; staminate spikes 2 or 3, long-peduncled; *pistillate spikes* 2 or 3, slender-peduncled or the upper sessile, *thick-cylindric*, 2–6 cm. long, 1.2–1.8 cm. thick, loosely flowered; *perigynia* glossy, *extremely membranaceous and bladder-like*, strongly nerved, globose-ovoid, 1 *cm. long*, 5–6.5 *mm. thick*, tapering gradually to the slender cylindric beak, much exceeding the oblong-ovate acute or acuminate scales. — Rich alluvial shores, rarely in swamps, N. B. to Lake St. John, Que., and Ont., s. to N. J., Ind., and Minn. June-Aug. Fig. 560.

560. C. Tuckermani.

ARÀCEAE (Arum Family)

Plants with acrid or pungent juice, simple or compound often veiny leaves, and flowers crowded on a spadix, which is usually surrounded by a spathe. — Floral envelopes none, or of 4–6 sepals. Fruit usually a berry. Seeds with fleshy albumen, or none, but filled with the large fleshy embryo. A large family, chiefly tropical. Herbage abounding in slender rhaphides. — The genuine *Araceae* have no floral envelopes, and are almost all monoecious or dioecious; but the genera of the third and fourth sections, with more highly developed flowers, are not to be separated.

* Spadix elongated, enveloped in a spathe; flowers destitute of perianth, monoecious or dioecious.

1. **Arisaema.** Flowers covering only the base of the spadix. Leaves not sagittate.
2. **Peltandra.** Flowers covering the spadix. Leaves sagittate.

** Spadix short-cylindric, subtended by an open spreading petaloid spathe; flowers (at least the lower ones) perfect, without perianth.

3. **Calla.** Flowers covering the whole spadix.

*** Spadix globose, enveloped in a very fleshy ovoid spathe; flowers perfect and perianth present.

4. **Symplocarpus.** Sepals 4, hooded.

**** Spadix cylindrical without obvious spathe; flowers perfect, perianth present.

5. **Orontium.** Spadix narrow, naked, terminating the terete scape.
6. **Acorus.** Spadix cylindrical, borne on the side of a leaf-like scape.

1. ARISAÈMA Martius. Indian Turnip. Dragon Arum

Spathe convolute below and mostly arched above. Flowers monoecious or by abortion dioecious. Sterile flowers above the fertile, each of a cluster of almost sessile 2–4-celled anthers, opening by pores or chinks at the top. Fertile flowers a 1-celled ovary containing 5 or 6 erect orthotropous ovules; in fruit a 1-few-seeded scarlet berry. — Low perennial herbs, with a tuberous rootstock or corm, sending up a simple scape sheathed with the petioles of the simple or compound veiny leaves. (Name from ἀρίς, a kind of *arum*, and αἷμα, *blood*, from the spotted leaves of some species.)

1. **A. triphýllum** (L.) Schott. (Indian Turnip, Jack-in-the-Pulpit.) *Leaves mostly* 2, *divided into* 3 *elliptical-ovate pointed leaflets; spadix mostly dioecious*, subcylindric or club-shaped, obtuse, much shorter than the spathe, which is smooth or corrugated in its tubular part and incurved-hooded at its flat ovate-lanceolate pointed summit. (*A. pusillum* Nash; *A. Stewardsonii* Britton.) — Rich woods. May. — Corm turnip-shaped, wrinkled, farinaceous, with an intensely acrid juice; spathe with the petioles and sheaths pale green, or often dark purple or variegated with dark purple and whitish stripes or spots.

2. **A. Dracóntium** (L.) Schott. (Green Dragon, Dragon Root.) *Leaf usually solitary, pedately divided* into 7–11 oblong-lanceolate pointed leaflets; *spadix often androgynous, tapering to a long and slender point* beyond the oblong and convolute-pointed greenish spathe. — Low grounds, w. N. E. to Fla., w. to Ont., Minn., e. Kan., and Tex. June. — Corms clustered; petiole 3–6 dm. long, much exceeding the peduncle.

2. PELTÁNDRA Raf. Arrow Arum

Spathe elongated, convolute throughout or with a dilated blade above. Flowers thickly covering the long and tapering spadix throughout (or only its apex naked). Anther-masses sessile, naked, covering all the upper part of the spadix, each of 4–6 pairs of cells embedded in the margin of a thick and shield-shaped connective, opening by terminal pores. Ovaries at the base of the spadix, each surrounded by 4–5 distinct, scale-like white staminodia, 1-celled, bearing 1-few amphitropous ovules at the base. Berries in an ovoid fleshy

head enveloped by the base of the leathery spathe. — Stemless herbs, with arrow-shaped or hastate palmately 3-nerved and pinnately veined leaves, and simple scapes from a thick fibrous or subtuberous root. (Name from πέλτη, *a small shield*, and ἀνήρ, for *stamen*, from the shape of the latter.)

1. **P. virgínica** (L.) Kunth. Scape 2–3.5 dm. high, about equaling the leaves; basal lobes of the leaves rather long and often acutish; spathe convolute throughout, wavy on the margin, mostly green; sterile portion of the spadix several times longer than the pistillate; ovules several; fruit green; seeds 1(–3). (*P. undulata* Raf.) — Shallow water, s. Me. to Fla., w. to s. Ont., Mich., and Mo. June.

3. CÁLLA L. Water Arum

Spathe ovate (abruptly pointed, the upper surface white), persistent. Lower flowers perfect and 6-androus; the upper often of stamens only. Filaments slender; anthers 2-celled, opening lengthwise. Ovary 1-celled, with 5–9 erect anatropous ovules. Berries (red) distinct, few-seeded. — A low perennial herb, growing in cold bogs, with a long creeping rootstock, bearing heart-shaped long-petioled leaves, and solitary scapes. (An ancient name, of unknown meaning.)

1. **C. palústris** L. — Cold bogs, N. S. to N. J., w. to Mich. and Minn., and northw. June. — Seeds surrounded with jelly. (Eurasia.)

4. SYMPLOCÁRPUS Salisb. Skunk Cabbage

Stamens 4, opposite the sepals, with at length rather slender filaments; anthers extrorse, 2-celled, opening lengthwise. Style 4-angled and awl-shaped; stigma small. Ovule solitary, suspended, anatropous. Fruit a globular or ovoid mass, composed of the enlarged and spongy spadix, inclosing the spherical seeds just beneath the surface, which is roughened with the persistent fleshy sepals and pyramidal styles. — Perennial herb, with a strong odor like that of the skunk, and also somewhat alliaceous; a very thick rootstock, and a cluster of very large and broad entire veiny leaves, preceded in earliest spring by the nearly sessile spathes, which barely rise out of the ground. (Name from συμπλοκή, *connection*, and καρπός, *fruit*, in allusion to the coalescence of the ovaries into a compound fruit.)

1. **S. foétidus** (L.) Nutt. Leaves ovate, cordate, becoming 3–6 dm. long, short-petioled; spathe spotted and striped with purple and yellowish-green, ovate, incurved. (*Spathyema* Raf.) — Bogs and moist grounds, N. S. to N. C., w. to Ont., Minn., and Ia.

5. ORÓNTIUM L. Golden Club

Spathe incomplete and distant, merely a leaf-sheath investing the lower part of the slender scape, and bearing a small and imperfect bract-like blade. Lower flowers with 6 concave sepals and 6 stamens; the upper ones with 4. Filaments flattened; anthers 2-celled, opening obliquely lengthwise. Ovary 1-celled, with an anatropous ovule. Fruit a green utricle. — An aquatic perennial, with a deep rootstock, and long-petioled entire oblong and nerved floating leaves. (Origin of the name obscure.)

1. **O. aquáticum** L. — Ponds, Mass. to Fla. May.

6. ÁCORUS L. Sweet Flag. Calamus

Sepals 6, concave. Stamens 6; filaments linear; anthers kidney-shaped, 1-celled, opening across. Ovary 2–3-celled, with several pendulous orthotropous ovules in each cell. Fruit at length dry, gelatinous inside, 1–few-seeded. — Aromatic, especially the thick creeping rootstocks (*calamus* of the shops). Leaves sword-like; the upper and more foliaceous prolongation of the scape may be considered as a kind of open spathe. (Ἄκορας, the ancient name, of no known meaning.)

1. **A. Cálamus** L. Scape leaf-like and prolonged far beyond the (yellowish-green) spadix. — Margins of rivulets, swamps, etc. (Eurasia.)

LEMNÀCEAE (Duckweed Family)

Minute stemless plants, floating free on the water, destitute of distinct stem and foliage, being merely a frond, producing one or few monoecious flowers from the edge or upper surface, and commonly hanging roots from underneath; ovules rising from the base of the cell. Fruit a 1–7-seeded utricle. Seed large. Embryo straight. — The simplest, and some of them the smallest of flowering plants, propagating by the proliferous growth of a new individual from a cleft in the edge or base of the parent frond, also by autumnal fronds in the form of minute bulblets, which sink to the bottom of the water, but rise and vegetate in spring; the flowers (in summer) and fruit scarce, in some species hardly ever seen. — These plants may be regarded as very simplified *Araceae*.

1. **Spirodela.** Frond 5–15-nerved, with several rootlets.
2. **Lemna.** Frond 1–5-nerved, with a single rootlet.
3. **Wolffia.** Frond thick, ovoid or ellipsoidal, very minute (0.5–1.3 mm. long), without rootlets.
4. **Wolffiella.** Fronds strap-shaped, thin, without rootlets.

1. SPIRODÈLA Schleid.

Anther-cells bilocellate by a vertical partition and longitudinally dehiscent. Ovules 2. Rootlets several, with axile vascular tissue. Otherwise as *Lemna*. (From σπεῖρα, *a cord*, and δῆλος, *evident*.)

1. **S. polyrhìza** (L.) Schleid. Fronds round-obovate (3–8 mm. long), thick, purple and rather convex beneath, dark green above, palmately (mostly 7-) nerved. — Common in ponds and pools, except near our n. limits. (Temp. and trop. regions.)

2. LÉMNA L. Duckweed. Duck's-meat

Flowers produced from a cleft in the margin of the frond, usually three together surrounded by a spathe; two of them staminate, consisting of a stamen only; the other pistillate, of a simple pistil; the whole therefore imitating a single diandrous flower. *Ster. Fl.* Filament slender; anther 2-celled, didymous; the cells dehiscent transversely. *Fert. Fl.* Ovary 1-celled; style and truncate or funnel-shaped stigma simple. Ovules and seeds 1–7. — Fronds 1–5-nerved, producing a single rootlet beneath (which is destitute of vascular tissue), proliferous from a cleft in the margin toward the base. (An old Greek name of uncertain meaning.)

* *Fronds oblong, long-stalked at base, remaining connected.*

1. **L. trisúlca** L. Fronds oblong to oblong-lanceolate (6–10 mm. long), attenuate at base into a slender stalk, denticulate at the tip, very obscurely 3-nerved, often without rootlets, usually several series of offshoots remaining connected; spathe sac-like; seeds ovate, amphitropous, with small round operculum. — Ponds and springy places, N. S. to N. J., Tex., and w. to the Pacific. (Temp. and trop. regions.)

** *Fronds oblong to elliptical or round-ovate, sessile, soon separating.*

2. **L. valdiviàna** Philippi. *Fronds elliptic-oblong*, small (2.5–4 mm. long), rather thick, usually somewhat falcate, *obscurely 1-nerved; spathe broad-reniform;* utricle long-ovate, pointed by the long style; *seed orthotropous*, oblong, *with a prominent acute operculum.* (*L. minor*, var. *cyclostasa* Ell.; *L. cyclostasa* of auth.) — Pools, Mass. to Fla. and westw. across the continent. (S. A.)

3. **L. perpusílla** Torr. *Fronds obovate or roundish-obovate*, oblique (2–3 mm. long), *obscurely 3-nerved;* utricle ovate; style rather long; *seed orthotropous*, ovate or oval, obtuse, *with scarcely apiculate operculum.* — Mass. to Fla., and w. to Dak. and Kan. Var. trinérvis Aust. has larger distinctly 3-nerved fronds, and an equally cordate seed. — N. J. to Kan. and I. T.

4. **L. minor** L. *Fronds round- to elliptic-obovate* (2–5 mm. in diameter), rather thick, *very obscurely 3-nerved; spathe sac-like;* utricle short-urn-shaped, tipped with a short style; seed oblong-obovate, *amphitropous, with prominent rounded operculum.* — Stagnant waters, except along our n. borders. (Temp. regions.)

3. WÓLFFIA Horkel.

Flowers central, bursting through the upper surface of the globular (or in some foreign species flat) and loosely cellular frond, only 2; one consisting of a single stamen with a 1-celled 2-valved anther; the other of a globular ovary, tipped with a very short style and a depressed stigma. Ovule orthotropous, rather oblique in the cell. Utricle spherical. Albumen thin. — Fronds rootless, proliferous from a cleft or funnel-shaped opening at the base, the offspring soon detached; no rhaphides. — The simplest and smallest of flowering plants, floating as little grains in or on the water. (Named for *Johann Friedrich Wolff*, who wrote on *Lemna* in 1801.)

Not dotted; upper surface strongly convex	1. *W. columbiana.*
Dotted.	
Upper surface flattish	2. *W. punctata.*
Upper surface low-conical	3. *W. papulifera.*

1. **W. columbiàna** Karst. Globose or globular, 0.7–1.5 mm. long, very loosely cellular, light green all over, not dotted; stomata 1–6; the opening at the base circular and with a thin border. — Floating rather beneath the surface of stagnant waters, Ct. to Fla., w. to Minn. and La.

2. **W. punctàta** Griseb. Oblong, smaller and more densely cellular, flattish and deep green with many stomata above, tumid and pale below, brown-dotted all over, anterior edge sharp; opening at base circular. (*W. brasiliensis* of auth., not Weddell.) — Ont. to the Gulf of Mex. — Growing with the preceding but floating on the surface.

3. **W. papulífera** C. H. Thompson. Lower surface hemispherical, the upper flattish at the margin, rising at the center to a single low papilla; flowers unknown. — Mo. (*Bush, Thompson*).

4. WOLFFIÉLLA Hegelm.

Flowers and fruit unknown. Fronds (in ours) linear-attenuate or flagellate, falcate or sigmoid, many times longer than wide, punctate, solitary or cohering at the base and radiating in a stellate manner. Pouch single, triangular, basal. — Small genus of imperfectly known plants. (Name a diminutive of *Wolffia.*)

1. **W. floridàna** (J. D. Sm.) Thompson. Fronds hollow, gradually attenuate from base to flagelliform apex, 6–8 mm. long. (*Wolffia gladiata*, var. J. D. Sm.) — Mo. to Fla. and Tex.

ERIOCAULÀCEAE (Pipewort Family)

Aquatic or marsh herbs, stemless or short-stemmed, with a tuft of fibrous roots, a cluster of narrow and often loosely cellular grass-like leaves, and naked scapes sheathed at the base, bearing dense heads of monoecious or rarely dioecious small 2–3-merous flowers, each in the axil of a scarious bract; the perianth double or rarely simple, chaffy; anthers introrse; the fruit a 2–3-*celled 2–3-seeded capsule;* seeds pendulous, orthotropous; embryo at the apex of mealy albumen. — Chiefly tropical plants, a few in northern temperate regions.

1. **Eriocaulon.** Perianth double, the inner (corolla) tubular-funnel-form in the staminate flowers. Stamens twice as many as the corolla-lobes (4). Anthers 2-celled.
2. **Syngonanthus.** Perianth as in the last. Stamens only as many as the corolla-lobes (3). Anthers 2-celled.
3. **Lachnocaulon.** Perianth simple, of 3 sepals. Stamens 3, monadelphous below. Anthers 1-celled.

1. ERIOCAÚLON [Gronov.] L. Pipewort

Flowers monoecious and androgynous, *i.e.* both kinds in the same head, either intermixed, or the central ones sterile and the exterior fertile, rarely dioecious. *Ster. Fl.* Calyx of 2 or 3 keeled or boat-shaped sepals, usually spatulate or dilated upward. Corolla tubular, 2–3-lobed, each of the lobes bearing a black gland or spot. Stamens inserted one at the base of each lobe and one in each sinus. Pistils rudimentary. *Fert. Fl.* Calyx as in the sterile flowers, often remote from the rest of the flower (therefore perhaps to be viewed as a pair of bractlets). Corolla of 2 or 3 separate narrow petals. Stamens none. Ovary often stalked, 2–3-lobed; style 1; stigmas 2 or 3, slender. Capsule membranaceous, loculicidal. — Leaves mostly smooth, loosely cellular and pellucid, flat or concave above. Flowers, also the tips of the bracts, etc., usually white-bearded or woolly. (Name compounded of ἔριον, *wool*, and καυλός, *a stalk*, from the wool at the base of the scape.) — Our species are all stemless, wholly glabrous excepting at the base and the flowers, with a depressed head and dimerous flowers.

1. E. decangulàre L. *Leaves obtuse*, varying from lanceolate to linear-awl-shaped, rather rigid, 6–40 cm. long; scapes 10–12-ribbed (3–9 dm. high); head hemispherical, becoming globose (6–14 mm. in diameter); scales of the involucre acutish, straw-color or light brown; *chaff* (bracts among the flowers) *pointed.* — Pine-barren swamps, N. J. and Pa. to Fla. and Tex.

2. E. compréssum Lam. *Leaves spreading* (5–12 cm. long), *grassy-awl-shaped*, rigid, or when submersed thin and pellucid, tapering gradually to a *sharp point*, mostly shorter than the sheath of the 10-*ribbed scape;* scales of the involucre very obtuse, turning lead-color; *chaff obtuse.* (*E. gnaphalodes* Michx.) — Pine-barren swamps, N. J. to Fla.

3. E. articulâtum (Huds.) Morong. Peduncles 1–several; *leaves* 2–8 cm. long, *awl-shaped, pellucid*, soft and very cellular; *scape* 4–7-*striate*, slender, 5–15 cm. high or when submersed becoming 3–20 dm. long according to the depth of the water; *chaff acutish;* head 5–9 mm. broad, at length depressed-globose; bracts, chaff, etc., lead-colored except where whitened by short but coarse beard; anthers longer than broad. (*E. septangulare* With.) — In ponds or along their borders, Nfd. to N. J., w. to Ind., Mich., Minn., and Ont. July, Aug. (Ireland and adjacent islands.)

4. E. Parkèri Robinson. Leaves lance-linear, 3–6 cm. long, attenuate from a base 3–4 mm. broad to a very sharp tip; peduncles 10–22, erect, slightly rigid; *heads small* (3–4 mm. in diameter), even in fruit surrounded by a *campanulate involucre; chaff and flowers nearly glabrous;* anthers as broad as long. — Banks of the Delaware R. near Camden, N. J. (*T. P. James, Parker.*)

2. SYNGONÁNTHUS Ruhland.

Stamens as many as the (often involute) lobes of the funnel-form corolla in the sterile flowers, and opposite them, commonly 3, and the flower ternary. Petals of the fertile flowers united to the middle. Otherwise nearly as in *Eriocaulon.* (Name from σύγγονος, *connate*, and ἄνθος, *flower*, from the united petals.)

1. S. flavídulus (Michx.) Ruhland. Tufted, stemless; leaves bristle-awl-shaped (2–7 cm. long); scapes (1–4 dm. high) very slender, simple, minutely pubescent, 5-angled; bracts of the involucre oblong, pale straw-color, those among the flowers mostly obsolete; perianth glabrous; sepals and petals of the fertile flowers linear-lanceolate, scarious-white. (*Paepalanthus* Kunth.) — Low pine-barrens, s. Va. to Fla. and Ala.

3. LACHNOCAÚLON Kunth. Hairy Pipewort

Flowers monoecious, etc., as in *Eriocaulon.* Calyx of 3 sepals. Corolla none! *Ster. Fl.* Stamens 3; filaments below coalescent into a club-shaped tube around the rudiment of a pistil, above separate and elongated; anthers 1-celled! *Fert. Fl.* Ovary 3-celled, surrounded by 3 tufts of hairs (in place of

a corolla). Stigmas 3, two-cleft. — Scape slender, bearing a single head, 2–3-angled, hairy. (Name from λάχνος, *wool*, and καυλός, *stalk*.)

1. L. ánceps (Walt.) Morong. Leaves linear-awl-shaped, tufted, villous. (*L. Michauxii* Kunth.) — Low pine-barrens, Va. to Fla. and Tex.

XYRIDÀCEAE (Yellow-eyed Grass Family)

Rush-like herbs, with narrow leaves sheathing the base of a naked scape, which is terminated by a head of perfect 3-androus flowers, with extrorse anthers, glumaceous calyx, and a regular colored corolla; the 3-valved mostly 1-celled capsule containing several or many orthotropous seeds with a minute embryo at the apex of fleshy albumen.

1. XÝRIS [Gronov.] L. Yellow-eyed Grass

Flowers single in the axils of coriaceous scale-like bracts, which are densely imbricated in a head. Sepals 3; the 2 lateral boat-shaped and persistent; the anterior one larger, enwrapping the corolla in the bud and deciduous with it. Petals 3, yellow (rarely white), with claws, which cohere more or less. Fertile stamens 3, inserted on the claws of the petals, alternating with 3 sterile filaments, which are cleft and in our species plumose or bearded at the apex. Style 3-cleft. Capsule oblong, free, 1-celled, with 3 parietal more or less projecting placentae, 3-valved, many-seeded. — Ours apparently all perennials. (Ξυρίς, a name of some plant with 2-edged leaves, from ξυρόν, *a razor*.)

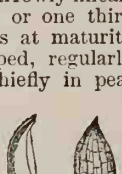
Lateral sepals about equaling the subtending bracts and concealed by them.
- Base not bulbous; keel of the lateral sepals with an erose wing.
  - Heads ovoid.
    - Leaf-blades strictly linear or broadest at the base; scape narrowly 2-margined.
      - Heads narrowly ovoid; flower-bearing scales few (4–7) at length dark brown . . . . . 1. *X. montana.*
      - Heads broadly ovoid; flower-bearing scales usually numerous, greenish or pale brown . . . . . 2. *X. caroliniana.*
    - Leaf-blades broadest in the middle; scape much flattened, conspicuously 2-winged . . . . . 3. *X. difformis.*
  - Heads ellipsoidal or subcylindric (southern) . . . . . 4. *X. elata.*
- Base bulbous; keel of the lateral sepals ciliolate . . . . . 5. *X. flexuosa.*

Lateral sepals evident, much exceeding the subtending bracts or exserted laterally.
- Keel of the lateral sepals slightly lacerate or erose . . . . . 6. *X. Smalliana.*
- Keel of the lateral sepals conspicuously fringed.
  - Base neither bulbous nor indurated . . . . . 7. *X. fimbriata.*
  - Base bulbous and indurated, dark brown . . . . . 8. *X. arenicola.*

1. X. montàna Ries. Dwarf and very slender, 1–(rarely)3 dm. high, somewhat caespitose from a more or less branching rootstock; leaves narrowly linear, rarely more than 4 cm. long, about one fourth or one third the length of the nearly filiform stipes; heads at maturity 4–6 mm. thick; seeds subcylindric-spindle-shaped, regularly ribbed. (*X. flexuosa*, var. *pusilla* Gray.) — Chiefly in peat bogs, Nfd. to Mt. Desert, Me., the uplands of N. Y., and e. Pa.; also on L. Superior. Fig. 561.

561. X. montana. Lateral sepal × 3⅓. Seed × 33.

2. X. caroliniàna Walt. Varying much in size; leaves grass-like, mostly 6–20 cm. long, one third to two thirds as long as the slightly ancipital stipe; roots a tuft of delicate fibers; rootstock apparently not developed; fruiting heads 8–10 mm. in diameter; seeds ovoid-spindle-shaped somewhat irregularly about 13-ribbed, when ripe claret-colored. — Wet sandy shores of lakes and pools, centr. Me. to Ind., and southw. Fig. 562.



562. X. caroliniana. Lateral sepal × 3⅓. Seed × 33.

3. X. diffórmis Chapm. Rather stout; leaves lance-linear, 7–12 mm. broad in the middle, thickish; scape strongly flattened, conspicuously 2-winged, 2–3

mm. broad; heads subglobose, in fruit about 1 cm. in diameter; seeds about 25-ribbed. — Sandy shores, Md. (*Canby*), and southw.

4. **X. elàta** Chapm. Tall (4–8 dm. high); leaves grass-like (2–4 dm. long), linear or gladiate from broadened strongly equitant bases; scape slender, only moderately compressed, ancipital but not winged; heads ellipsoidal or subcylindric, 1.4–3 cm. long; floriferous scales numerous, suborbicular. — Sandy shores, Va. to Fla. and Miss.

563. X. flexuosa. Lateral sepal × 3⅓.

5. **X. flexuòsa** Muhl. Leaves narrowly linear, pale green, thickish, twisted, from a small bulb-like base; stipe 3–6 dm. high, twisted and flexuous, slightly compressed toward the summit, not winged; head subglobose, about 1 cm. in diameter; scales suborbicular, pale brown, the greenish area small and ill-defined; lateral sepals ciliolate on the keel. — Wet places, chiefly in sandy soil, e. Mass. to Minn., Tex., and S. C. Fig. 563.

564. X. Smalliana. Lateral sepal × 3⅓.

6. **X. Smalliàna** Nash. Tall (4–9 dm. high); leaves broadly linear or sword-shaped, 2.5–6 dm. long, often nearly 2 cm. broad at the equitant and commonly proliferous base, neither twisted nor flexuous; scape rather slender, straight, compressed near the summit; heads obovoid or ovoid-ellipsoidal, at maturity about 10–12 mm. in diameter; scales broadly ovate, green with a stramineous or pale-brown border; lateral sepals long and narrow, erose-lacerate on the usually narrow wing; seeds for the genus long, subcylindric, regularly ribbed, pale in color. — Chiefly on boggy shores rich in decaying vegetation, often in water, e. Mass. to Fla. — The northern form, which has the lateral sepals a little less lacerate on the keel, has been published as *X. Congdoni* Small. Fig. 564.

565. X. fimbriata. Lateral sepal × 3⅓.

7. **X. fimbriàta** Ell. Tall, strict; leaves broadly linear, straight; scape straight or nearly so, 5–8 dm. high, compressed and roughened on the edges toward the summit; heads ellipsoidal, about 12–15 mm. in diameter, nearly 2 cm. long; fringed sepals conspicuous, nearly twice as long as the bracts. — Pine-barrens, N. J. to Fla. and Miss. Fig. 565.

566. X. arenicola. Lateral sepal × 3⅓.

8. **X. arenícola** Small. Base thick and bulb-like, surrounded by broad chestnut-colored scales, the enlarged and hardened persistent bases of former leaves; slender stipe and very narrow thickish leaves twisted and flexuous; head cylindric, 1-2.5 cm. long, acutish, 8–10 mm. thick; fringed sepals conspicuous. (*X. torta* of auth., not Sm.) — Pine-barrens, N. J. to Fla. and Miss. Fig. 566.

MAYACÀCEAE (Mayaca Family)

Moss-like aquatic plants, densely leafy, with narrowly linear sessile pellucid leaves, axillary naked peduncles terminated by a solitary perfect 3-androus flower, herbaceous calyx, white corolla, and a 3-valved 1-celled several-seeded capsule. — A single genus.

1. MAYÀCA Aublet.

Perianth persistent, of 3 herbaceous lanceolate sepals, and 3 obovate petals. Stamens alternate with the petals. Ovary with 3 parietal few-ovuled placentae; style filiform; stigma simple. — Creeping or floating in shallow water; leaves entire, minutely notched at the tip; peduncle solitary, sheathed at base. (An aboriginal name.)

1. **M. Aublèti** Michx. Peduncles deflexed in fruit; capsules about 9-seeded. (*M. Michauxii* Schott & Endl.) — Va. and O. to Fla. and Tex.

COMMELINACEAE (Spiderwort Family)

Herbs, with fibrous or sometimes thickened roots, jointed and often branching leafy stems, and chiefly perfect and 6-androus often irregular flowers, with the perianth free from the 2–3-celled ovary, and having a distinct calyx and corolla; viz., 3 persistent commonly herbaceous sepals, and 3 petals, ephemeral, decaying or deciduous. Stamens hypogynous, often some of them sterile; anthers with 2 separated cells. Style 1; stigma undivided. Capsule 2–3-celled, 2–3-valved, loculicidal, 3–several-seeded. Seeds orthotropous. Leaves entire, parallel-veined, sheathed at base; the uppermost often dissimilar and forming a kind of spathe. — Chiefly tropical.

1. **Tradescantia.** Bracts leaf-like or small and scarious. Petals equal. Perfect stamens 6; filaments bearded.
2. **Commelina.** Cyme sessile within a cordate or connate bract (spathe). Petals unequal. Perfect stamens 3; filaments naked.

1. TRADESCÁNTIA [Rupp.] L. Spiderwort

Flowers regular. Sepals herbaceous. Petals all alike, ovate, sessile. Stamens all fertile; filaments bearded. Capsule 2–3-celled, the cells 1-2-seeded. — Perennials. Stems mucilaginous, mostly upright, nearly simple, leafy. Leaves keeled. Flowers ephemeral, in umbeled clusters, axillary and terminal, produced through the summer; floral leaves nearly like the others. (Named for the elder *Tradescant*, gardener to Charles the First of England.)

Umbels long-peduncled; bracts short, subscarious . . . . . 1. *T. rosea.*
Umbels sessile or nearly so, much surpassed by the leaf-like bracts.
  Dwarf, rarely over 1 dm. high, villous; pedicels 2–6 cm. long, thread-like . 2. *T. brevicaulis.*
  Taller, 3–8 dm. high.
    Stem geniculate, the subsessile umbels axillary as well as terminal . . 3. *T. pilosa.*
    Stem straight, simple or branched; umbels terminal.
      Sepals entirely glabrous, or one or more of them with a tuft of hairs near the involute slightly hooded apex . . . . . 4. *T. reflexa.*
      Sepals villous with non-glandular hairs . . . . . 5. *T. virginiana.*
      Sepals glandular-villous.
        Bracts broader than the leaves . . . . . 6. *T. bracteata.*
        Bracts not broader than the leaves . . . . . 7. *T. occidentalis.*

1. **T. rò̀sea** Vent. Small, slender (1.5–4 dm. high), smooth, erect from a running rootstock; leaves linear, grass-like, 1–5 (rarely as much as 11) mm. broad. — Sandy woods, Md. to Fla., w. to Mo. and "Tex."

2. **T. brevicaúlis** Raf. *Often stemless or nearly so,* very hairy; roots a cluster of dark more or less thickened fibers; leaves lance-linear; *sepals ovate-lanceolate, 1–1.5 cm. long, villous;* petals large, purplish-blue or more often rose-colored. (*T. virginica*, var. *villosa* Wats.) — Moist sandy soil, centr. Ind. (*H. H. Bartlett*) to Ky., Tex., and Kan. Apr., May.

3. **T. pilò̀sa** Lehm. *Tall,* stout, 4–7 dm. high, *zigzag;* leaves large, flat, often 3–4 cm. wide, dark green above, finely pubescent on both surfaces, rarely subglabrous; *sepals* pilose or smoothish, *ovate-oblong, 6–9 mm. long;* petals blue. (*T. flexuosa* Raf.) — Woods and shaded banks of streams, Pa. to Mo. and Ga.

4. **T. refléxa** Raf. *Slender,* glabrous or nearly so, *glaucous;* leaves narrow, linear-attenuate from a lanceolate base, strongly involute; umbels terminal on the stems and branches, many-flowered; *narrow bracts and glabrous pedicels soon deflexed; sepals* ovate-lanceolate, 8–13 mm. long, *glabrous except at the often tufted tip;* petals blue, 10–14 mm. long. — Wet places, O. to Mich., Minn., Kan., Tex., and S. C.

5. **T. virginiàna** L. Green; leaves flat, linear or lance-linear, the upper more or less pubescent; bracts leaf-like, elongated, usually ascending; *pedicels and sepals villous,* the latter about 1.5 cm. long; petals rich purplish-blue, 1.6–2 cm. long. — Alluvial soil, Ct. to Pa. and S. C.: also introd. northw.

6. T. bracteàta Small. *Sordid glandular-villous above; bracts relatively large*, conduplicate, recurved, *their bases 2–2.8 cm. broad;* flowers large, 2.5–3 cm. in diameter. — Prairies, "Minn.," and Ia. to Tex. and B. C.

7. T. occidentàlis (Britton) Smyth. Slender, 3 dm. high; *leaves narrowly linear, involute*, their bases often enlarged and scarious; *the bracts scarcely if at all broader than the foliar leaves; sepals glandular-pubescent*, about 1 cm. long; petals blue (or roseate), about 1.4 cm. long. — "Ia." to Neb., Tex., and N. Mex.

T. MONTÀNA Shuttlw., not Heyne, a southern species distinguished from *T. virginiana* chiefly by its smaller flowers and smoother calyx and from *T. reflexa* by its broader greener leaves, is said to extend as far north as Va. and Ky.

2. COMMELÌNA [Plum.] L. DAY-FLOWER

Flowers irregular. Sepals somewhat colored, unequal; the 2 lateral partly united. Two lateral petals rounded or kidney-shaped, on long claws, the odd one smaller. Stamens unequal, 3 of them fertile, one of which is bent inward; 3 of them sterile and smaller, with imperfect cross-shaped anthers; filaments naked. — Often procumbent and rooting at the joints. Leaves contracted at base into sheathing petioles; the floral one heart-shaped and clasping, folded together or hooded, forming a spathe inclosing the flowers, which expand for a single morning and are recurved on their pedicel before and afterward. Petals blue. Flowering all summer. Ours all with perennial roots, or propagating by striking root from the joints. (Dedicated to the early Dutch botanists *J.* and *G. Commelin.*)

* *Ventral cells 2-ovuled (usually 2-seeded), the dorsal 1-ovuled.*

1. C. commùnis L. *Slender and creeping*, nearly glabrous; leaves lanceolate, 2–5 cm. long; spathe cordate, acute, *with margins not united; seeds shallowly pitted, granulate-reticulated.* (*C. nudiflora* auth., not L.) — Alluvial banks, Del. to Fla., w. to Kan. and Tex. — A frequent weed of dooryards and gardens, northeastw. to e. Mass. (E. Asia, Trop. reg.)

2. C. hirtélla Vahl. *Stout, erect*, 6–12 dm. high; leaves large, lanceolate, *the sheaths brown-bearded;* spathes crowded, *with margins united; seeds smooth.* — River-banks, Pa. to Fla., w. to I. T. and Tex.

** *Cells 1-ovuled, 1-seeded; seeds smooth; spathe cucullate; roots subtuberous.*

3. C. erécta L. Slender, often low; *leaves linear; cells all dehiscent.* — Pa. to Fla. and Tex.

4. C. virgínica L. Slender, usually tall; *leaves lanceolate* to linear; *dorsal cell indehiscent, scabrous.* — Damp rich woods and banks, s. N. Y. to Fla., w. to Mich., Kan., and Tex.

BROMELIÀCEAE (PINEAPPLE FAMILY)

Herbs (or scarcely woody plants, nearly all tropical), the greater part epiphytes, with persistent dry or fleshy and channeled crowded leaves, sheathing at the base, usually covered with scurf.

1. TILLÁNDSIA L. LONG MOSS

Perianth plainly double, 6-parted; the 3 outer divisions (sepals) membranaceous; the 3 inner (petals) colored; all connivent below into a tube, spreading above, lanceolate. Stamens 6, hypogynous or the alternate ones adhering to the base of the petals; anthers introrse. Ovary free; style thread-shaped; stigmas 3. Capsule cartilaginous, 3-celled. Seeds several or many in each cell, anatropous, club-shaped, pointed, raised on a long hairy-tufted stalk, like a coma. — Scurfy-leaved epiphytes. (Named for *Prof. Tillands* of Abo.)

1. T. usneoìdes L. (COMMON LONG MOSS or BLACK MOSS.) Stems thread-

shaped, branching, pendulous; leaves thread-shaped; peduncle short, 1-flowered; flower yellow. — E. Va., s. to Fla., and westw.; growing on the branches of trees, forming long hanging tufts.

PONTEDERIÀCEAE (Pickerel-weed Family)

Aquatic herbs, with perfect more or less irregular flowers from a spathe; the petal-like 6-merous perianth free from the 3-celled ovary; the 3 or 6 mostly unequal or dissimilar stamens inserted in its throat. — Perianth with the 6 divisions colored alike, *imbricated* in 2 rows in the bud, the whole together sometimes revolute-coiled after flowering, then withering away, or the base thickened-persistent and inclosing the fruit. Anthers introrse. Ovules anatropous. Style 1; stigma 3-lobed or 6-toothed. Fruit a perfectly or incompletely 3-celled many-seeded capsule or a 1-celled 1-seeded utricle. Embryo slender, in floury albumen.

1. **Pontederia.** Spike many-flowered. Perianth 2-lipped, its fleshy persistent base inclosing the 1-seeded utricle. Stamens 6.
2. **Heteranthera.** Spathe 1–few-flowered. Perianth salver-shaped. Stamens 3. Capsule many-seeded

1. PONTEDÈRIA L. Pickerel-weed

Perianth funnel-form, 2-lipped; the 3 upper divisions united to form the 3-lobed upper lip; the 3 lower spreading, and their claws, which form the lower part of the curving tube, more or less separate or separable to the base; tube after flowering revolute-coiled. Stamens 6; the 3 anterior long-exserted; the 3 posterior (often sterile or imperfect) with very short filaments, unequally inserted lower down; anthers versatile, oval, blue. Ovary 3-celled; two of the cells empty, the other with a single suspended ovule. Utricle 1-celled. — Stout herbs, with thick creeping rootstocks, producing erect long-petioled leaves, and a 1-leaved stem, bearing a spike of violet-blue ephemeral flowers. Root-leaves with a sheathing stipule within the petiole. (Dedicated to *Pontedera*, Professor at Padua in the 18th century.)

1. **P. cordàta** L. Leaves heart-shaped, blunt; spike dense, from a spathe-like bract; upper lobe of perianth marked with a pair of yellow spots (rarely all white); calyx-tube in fruit crested with 6-toothed ridges. — N. S. to Ont., Minn., and Tex. July–Sept. (Trop. Am.) Var. angustifòlia Torr. Leaves lanceolate or triangular-attenuate, roundish or truncate at base. — Same range.

2. HETERANTHÈRA R. & P. Mud Plantain

Perianth with a slender tube; the limb somewhat equally 6-parted, ephemeral. Stamens in the throat, usually unequal; anthers erect. Capsule 1-celled or incompletely 3-celled by intrusion of the placentae. — Low herbs, in mud or shallow water, with a 1–few-flowered spathe bursting from the sheathing side or base of a petiole. (Name from ἑτέρα, *different*, and ἀνθηρά, *anther*.)

* *Stamens unequal; 2 posterior filaments with ovate yellow anthers; the other longer, with a larger oblong or sagittate greenish anther; capsule incompletely 3-celled; leaves rounded, long-petioled; creeping or floating plants.*

1. **H. renifórmis** R. & P. Leaves round-kidney-shaped to cordate and acute; spathe 3–5-flowered; flowers white or pale blue. — Ct. to Neb., and southw. (S. A.)
2. **H. limòsa** (Sw.) Willd. Leaves oblong or lance-oblong, obtuse at both ends; spathe 1-flowered; flowers larger, blue. — Va. to Neb., and southw. (S. A.)

* * *Stamens alike, with sagittate anthers; capsule 1-celled, with 3 parietal placentae; leaves linear, translucent, sessile; submerged grass-like herbs, with only the flowers reaching the surface.*

3. **H. dùbia** (Jacq.) MacM. The slender branching stems clothed with leaves and bearing a terminal 1-flowered spathe (becoming lateral); flowers small, pale yellow, with a very long thread-like tube. (*H. graminea* Vahl.) — N. E. to Ont., westw. and southw.

JUNCÀCEAE (Rush Family)

Grass-like or rush-like herbs, with small regular and hypogynous persistent flowers, 3 glumaceous sepals, and 3 similar petals, 6 or rarely 3 stamens with 2-celled anthers, a single short style, 3 filiform hairy stigmas, and an ovary either 3-celled or 1-celled with 3 parietal placentae, forming a loculicidal 3-valved capsule. Seeds anatropous, with a minute embryo inclosed at the base of the fleshy albumen. — Flowers liliaceous in structure, but sedge-like in aspect and texture.

1. **Juncus**. Capsule 3-celled (sometimes imperfectly so), many-seeded. Plants never hairy.
2. **Luzula**. Capsule 1-celled, 3-seeded. Plants often hairy.

1. JÚNCUS [Tourn.] L. Rush. Bog Rush

Capsule 3-celled, or 1-celled by the placentae not reaching the axis. Stamens when 3 opposite the 3 sepals. — Chiefly perennials, and in wet soil or water, with pithy or hollow and simple (rarely branching) stems, and cymose or clustered small (greenish or brownish) flowers, chiefly in summer. (The classical name, from *jungere*, to join, alluding to the use of the stems for bands.)

a. Inflorescence appearing lateral; the involucral leaf erect, similar to and continuing the naked or essentially naked scape; rootstock creeping *b.*
  b. Sheaths at base of the scape leafless.
    Stamens 3.
      Capsule tipped by a crown-like blunt mucro, formed by the thick base of the style; inflorescence densely capitate . 17. *J. conglomeratus.*
      Capsule truncate or emarginate at tip, without a distinct mucro.
        Inflorescence loose, the primary branches conspicuous . . 16. *J. effusus.*
        Inflorescence a dense head, the primary branches short and inconspicuous . . . . . (16) *J. effusus*, v. *compactus.*
    Stamens 6.
      Flowers greenish; capsule broadly ovoid, barely mucronate, about equaling the calyx . . . . . 15. *J. filiformis.*
      Flowers brown; capsule more or less trigonous, distinctly mucronate.
        Calyx 2–2.7 mm. long, much exceeded by the capsule . . 18. *J. Smithii.*
        Calyx 3.5–5 mm. long, nearly or quite equaling the capsule 14. *J. balticus*, v. *littoralis.*
  b. Sheaths (or at least the inner ones) bearing long terete scape-like leaves.
    Flowers solitary at the tips of the ultimate ramifications of the cyme; capsule subglobose, 3–4 mm. in diameter, about equaled by the spreading sepals . . . . . 10. *J. setaceus.*
    Flowers clustered at the tips of the ultimate branchlets; capsule trigonous, barely 2 mm. broad; sepals and petals appressed-ascending.
      Capsule broadly ovoid, about equaling the calyx; seeds ovoid, obtuse . . . . . 19. *J. Roemerianus.*
      Capsule ellipsoid, exceeding the calyx; seeds with long caudate tips . . . . . 20. *J. maritimus.*
a. Inflorescence terminal *c.*
  c. Leaves flat, or somewhat terete, or setaceous and channeled, but never septate *d.*
    d. Annuals with soft bases and fibrous roots.
      Sepals much shorter than the rigid petals; flowers in dense clusters; stamens 3; capsule subulate . . . . 42. *J. repens.*
      Sepals equaling or exceeding the petals; stamens 6; capsule ellipsoid or ovoid.

Sepals and petals all long-attenuate and exceeding the capsule; seeds ovoid, apiculate.
Flowers scattered singly along the one-sided usually dichotomous branches . . . . . 1. *J. bufonius.*
Flowers clustered . . . . . (1) *J. bufonius*, v. *congestus.*
Petals blunt or obtuse, shorter than or only slightly exceeding the capsule; seeds truncate . . . . (1) *J. bufonius*, v. *halophilus.*
d. Perennials *e.*
e. Flowers prophyllate, *i.e.* subtended by bracteoles (2) in addition to the bractlet at base of pedicel *f.*
f. Leaf-sheaths with fimbriate auricles; flowers 1–4, 5–20 times exceeded by the thread-like subtending leaf.
Basal sheaths with setiform scarcely leaf-like blades; cauline leaves mostly crowded at the summit; flowers usually 2–4 . . . . . 2. *J. trifidus.*
Basal sheaths bearing long leaves; cauline leaves scattered; flowers usually solitary . . . . . (2) *J. trifidus*, v. *monanthos.*
f. Leaf-sheaths with entire (or merely erose) auricles; flowers (except in depauperate individuals) numerous *g.*
g. Leaf-sheaths covering one half the stem or more; the brown and greenish sepals obtuse, and incurved at tip . . 3. *J. Gerardi.*
g. Leaf-sheaths covering one fourth the stem or less; sepals acute or acuminate *h.*
h. Seeds with long caudate appendages.
Inflorescence exceeding the erect bracts; capsule 4.5–6 mm. long, usually exceeding the calyx . . . 11. *J. Vaseyi.*
Inflorescence exceeded by the bracts; capsule much shorter than the calyx . . . . . 12. *J. oronensis.*
h. Seeds short-pointed or blunt *i.*
i. Capsule reddish or castaneous, ellipsoid, much exceeding the calyx . . . . . 13. *J. Greenei.*
i. Capsule green or straw-colored (brown in age), shorter than or about equaling the calyx *j.*
j. Leaves flat (or in age becoming involute) *k.*
k. Auricles at the summit of the sheaths scarious, whitish, conspicuously extended beyond the point of insertion; bracts exceeding the inflorescence *l.*
l. Capsule at least two thirds as long as the spreading-ascending sepals.
Flowers mostly clustered at the tips of the branches of the inflorescence . . . 4. *J. tenuis.*
Flowers scattered and secund along the branches.
Branches of inflorescence loosely ascending, elongate, the ultimate floriferous branchlets elongate and ascending . . (4) *J. tenuis*, v. *anthelatus.*
Ultimate floriferous branchlets widely spreading, 0.5–2 cm. long . . . . . (4) *J. tenuis*, v. *Williamsii.*
l. Capsule less than one half as long as the closely appressed sepals . . . . . 6. *J. monostichus.*
k. Auricles at the summit of the sheaths not conspicuously extended beyond the point of insertion.
Bracts shorter than the cymes; flowers 2.5–3.5 mm. long, scattered and secund along the ascending or incurved branches . . . . 7. *J. secundus.*
Bracts (or at least the lowermost) exceeding the cymes; flowers mostly larger, not conspicuously secund.
Inflorescence and basal sheaths straw-colored or the latter somewhat darker.
Sheaths and auricles membranaceous, pale; perianth erect . . . . . 5. *J. interior.*
Sheaths and auricles cartilaginous, darker; perianth spreading . . . . . 8. *J. Dudleyi.*
Inflorescence brownish; inner basal sheaths strongly purple-tinged . . (9) *J. dichotomus*, v. *platyphyllus.*
j. Leaves terete, or at most slightly grooved along the upper surface . . . . . 9. *J. dichotomus.*
e. Flowers eprophyllate, *i.e.* with only the bractlet at the base of the very short pedicel *m.*
m. Capsules at most 4 mm. long, rarely exceeding the calyx; flowers glomerulate, mostly in freely branched cymes.
Leaves terete, scape-like.
Capsule broadly ovoid, about equaling the calyx; seeds ovoid, obtuse . . . . . 19. *J. Roemerianus.*
Capsule ellipsoid, slightly exceeding the calyx; seeds with long caudate tips . . . . . 20. *J. maritimus.*
Leaves flat, grass-like.

Stamens included in fruit.
Petals ovate or oblong, blunt . . . . . 43. *J. marginatus.*
Petals lance-attenuate, aristate . . . (43) *J. marginatus*, v. *setosus.*
Stamens persistent and exserted in fruit . . . . . 44. *J. aristulatus.*
m. Capsules 6-9 mm. long, much exceeding the calyx; flowers few, in 1–4 terminal glomerules . . . . . 41. *J. stygius*, v. *americanus.*
o. Leaves hollow, nodulose, *i.e.* with septa at regular intervals *n.*
n. Seeds with definite caudate tips *o.*
o. Leaves papillose-scabrous; stamens 6; seeds 2–3 mm. long . 21. *J. asper.*
o. Leaves smooth; stamens 3; seeds shorter *p.*
p. Flowers with the mature fruit about 2.5 (rarely 3.5) mm. long; sepals obtuse; seed ellipsoid, barely 1 mm. long, with very short tails . . . . . 22. *J. brachycephalus.*
p. Flowers with mature fruit about 4 mm. long; petals attenuate, acute; seed spindle-shaped, with conspicuous tails.
Inflorescence (when well developed) ovoid or broader, one third longer than broad; the glomerules many-flowered; capsule equaling or slightly exceeding the calyx.
Capsule abruptly short-pointed; seed 1–1.8 mm. long . 24. *J. canadensis.*
Capsule gradually tapering to tip; seed scarcely 1 mm. long . . . . . (24) *J. canadensis*, v. *subcaudatus.*
Inflorescence elongate, strict, and narrow, 3–6 times longer than broad; capsule much exceeding the calyx, gradually tapering; seed about 1 mm. long . . . . . 23. *J. brevicaudatus.*
n. Seeds merely pointed or blunt, not caudate *q.*
q. Stamens 3 *r.*
r. Capsule attenuate to tip or subulate, distinctly exceeding the calyx *s.*
s. Heads 2–7-flowered; capsule not subulate.
Mature fruit 3.5 mm. long . . . . . 36. *J. debilis.*
Mature fruit 5 mm. long . . . . . 37. *J. diffusissimus.*
s. Heads densely many-flowered; capsule subulate.
Leaves flattened, obscurely septate; sheaths without auricles at summit; cyme large, with widely divergent branches and branchlets . . . . . 29. *J. polycephalus.*
Leaves terete, distinctly septate; sheaths with definite auricles at summit; branches and branchlets ascending.
Blade of the uppermost leaf much shorter than its sheath . . . . . 34. *J. megacephalus.*
Blade of uppermost leaf much longer than its sheath . 33. *J. scirpoides.*
r. Capsule shorter than or about equaling the calyx, if longer, abruptly tipped (not subulate) *t.*
t. Capsule half or two thirds as long as the calyx, tapering gradually to a conic-subulate beak; glomerules spherical; the rigid subulate sepals much exceeding the petals; rootstock thick, white, horizontal . . . 32. *J. brachycarpus.*
t. Capsule nearly equaling or exceeding the calyx, abruptly tipped; glomerules hemispherical; sepals and petals subequal; stems tufted or with merely thickened base.
Basal leaves abundant, tufted from a thickened base, often elongate and floating, obscurely septate; stems lax, decumbent or repent, 0.5–2.5 dm. high; petals blunt 27. *J. bulbosus.*
Basal leaves few, erect; plant erect, 3 dm. or more high; petals acuminate.
Heads 1–50, on ascending-spreading branches; flowers 3–3.5 mm. long . . . . . 35. *J. acuminatus.*
Heads 200–500, on widely divergent branches; flowers 2–2.5 mm. long . . . . . 38. *J. robustus.*
q. Stamens 6 *u.*
u. Upper cauline leaves bladeless (or essentially so), consisting of firm tawny or colored sheaths 2.5–5 cm. long; the middle leaf erect, much overtopping the inflorescence . 28. *J. militaris.*
u. Upper cauline leaves with blades, or, if bladeless, very small *v.*
v. Flowers solitary or in 2's, often accompanied or replaced by fascicles of small leaves.
Stem erect, from a horizontal rootstock; flowers secund on the branchlets of a loose dichotomous cyme; fascicles of reduced leaves confined to the inflorescence; anthers much exceeding the filaments . . . 25. *J. pelocarpus.*
Stem repent or floating, bearing scattered fascicles of reduced leaves; roots tufted; flowers 1 or 2 on axillary or subterminal peduncles; anthers about equaled by the filaments . . . . . 26. *J. subtilis.*
v. Flowers more numerous, in glomerules *w.*
w. Lower leaves elongate, filiform, floating, upper stouter; glomerules mostly bearing fascicles of small leaves; capsule blunt . . . . . 27. *J. bulbosus.*
w. Leaves uniform, none floating; glomerules without fascicles of leaves *x.*

x. Glomerules spherical; sepals subulate; capsules subulate or lance-subulate; involucral bract usually exceeding the inflorescence.
Flowers 3–4 mm. long, reddish-brown; petals equaling or exceeding the sepals . . . . . 30. *J. nodosus.*
Flowers 4–5 mm. long, greenish or dull brown; petals much shorter than the sepals . . . . . 31. *J. Torreyi.*
x. Glomerules hemispherical; sepals blunt or acuminate, at most mucronate-tipped; capsules ovoid or ellipsoid; involucral bract much shorter than the inflorescence *y.*
y. Sepals acuminate; branches of the inflorescence widely divergent.
Flower brown or brownish; capsule dark brown, 3–4 mm. long, gradually tapering to the mucronate tip . . . . . 40. *J. articulatus.*
Flower greenish; capsule pale brown, 2.5–3 mm. long, abruptly mucronate . . . . . (40) *J. articulatus*, v. *obtusatus.*
y. Sepals blunt, often mucronate-tipped; branches of inflorescence erect or strongly ascending.
Branches strictly erect; glomerules loosely few-flowered, generally with one or more flowers elevated on slightly elongate pedicels.
Flowers castaneous . . . . . 39. *J. alpinus.*
Flowers greenish or straw-colored . . . . . (39) *J. alpinus*, v. *insignis.*
Branches spreading-ascending; glomerules compactly and regularly flowered . . . . . (39) *J. alpinus*, v. *fuscescens.*

§ 1. *Flowers prophyllate*, i.e. *subtended by bracteoles* (2) *in addition to the bractlet at base of pedicel.*

* *Inflorescences mostly terminal; leaves flat or canaliculate, rarely terete.*

1. J. bufónius L. Stems low and slender (0.3–3.5 dm. high), leafy, often branched from the base; cyme spreading; *flowers remote*, greenish (3–7 mm. long), rarely viviparous, or even converted into leafy tufts; sepals and petals linear-lanceolate, awl-pointed; stamens short; filaments slightly longer than the anthers; *seeds narrowly ovoid or ellipsoidal* (0.3–0.5 mm. long).—Damp open ground, roadsides, etc., common. June–Nov. (Cosmop.) Fig. 567.

567. J. bufonius. Part of inflorescence × 2/3. Seed × 50.

Var. congéstus Wahlb. *Flowers mostly in glomerules.*—Infrequent. (Eu.)

Var. halóphilus Buchenau & Fernald. More fleshy throughout; *flowers mostly in 2's or 3's;* whitish petals obtuse; *seeds short-cylindric, abruptly truncate at one end.*—Brackish shores, Gulf of St. Lawrence to Mass.; Neb. to Rocky Mts., etc. June–Sept. (Eu.) Fig. 568.

2. J. trífidus L. Stems *densely tufted from matted creeping rootstocks*, erect (1–4 dm. high), sheathed and *mostly leafless at base, 2–3-leaved at the summit;* flowers brown (3–4 mm. long); sepals ovate-lanceolate, acute, equaling or rather shorter than the ovate *beak-pointed deep-brown capsule;* anthers much longer than the filaments; seeds few, oblong, angled (1.5–2 mm. long), short-tailed.—Alpine summits, Lab. to N. E. and N. Y. June–Aug. (Greenl., Eurasia.)

568. J. buf., v. hal. Part of inflorescence × 2/3. Seed × 30.

Var. monánthos (Jacq.) Bluff & Fingerhuth. Taller (2.5–6 dm. high), the *numerous basal leaves often equaling the culms.*—Local, mts. of s. N. Y. to Va. and N. C. (Eu.)

3. J. Gerárdi Loisel. (Black Grass.) Stems scarcely flattened, rigid (1.5–8 dm. high); cyme contracted, usually longer than the bracteal leaf; flowers 3–4 mm. long; sepals oval-oblong, nearly or quite as long as the ovoid obtuse and mucronate capsule; anthers much longer than the short filaments; style as long as the ovary; seeds (0.4–0.5 mm. long) obovoid, delicately ribbed and cross-lined.—Salt marshes; common along the coast, rarely inland in Me., Vt., N. Y., and about the Great Lakes. June–Sept. (Eurasia, n. Afr.)

4. J. ténuis Willd. Stem wiry (0.5–6 dm. high); *cyme 1–8 cm. long*, loose, or barely crowded; *flowers green* (3–4.5 mm. long), *mostly aggregated at the tips of the branches;* sepals lanceolate, very acute, spreading in fruit, longer than

569. J. tenuis. Inflorescence × 2/3. Sheath with auricles × 2.

the ovoid retuse scarcely pointed green falsely 1-celled capsule; anthers much shorter than the filaments; style very short; seeds small (3–4 mm. long), delicately ribbed and cross-lined. — Fields and roadsides, very common. June–Sept. (Eu., n. Afr.) Fig. 569.

Var. anthelàtus Wiegand. Tall (4–9 dm. high) and loose; *cyme loose*, 6–18 *cm. long;* flowers usually 2.5–3.5 mm. long. — Me. to Mo. and Tex.

Var. Williámsii Fernald. Comparatively low (2.5–5 dm. high) and slender; inflorescence 3–8 cm. long; capsule about equaling the calyx. — Gulf of St. Lawrence to Ct. and N. Y. (Eu.)

5. J. intèrior Wiegand. Comparatively stout, 4.5–9 dm. high; leaves about one third as long as the scapes; inflorescence 3–10 dm. long, with very ascending branches, the flowers 3–4 mm. long; capsule obscurely 3-celled; anthers much shorter than the filaments; seeds 3.5–5 mm. long. — Prairies, Ill. to Wyo. and Tex. Apr.–July. Fig. 570.

570. J. interior. Inflorescence × 2/3.

6. J. monóstichus Bartlett. Erect, 3–5 dm. tall; culms compressed; leaves basal, $\frac{1}{2}$–$\frac{3}{4}$ as long as the culms, the blades involute in drying, the auricles as in *J. tenuis;* inflorescence 4–8 cm. long, much exceeded by the lowest bract, finally stramineous, the branches 1–2.5 cm. long, often incurved, bearing 3–9 secund flowers; perianth 4–5 mm. long, the sepals lance-acuminate, entirely concealing the trigonous-ovoid falsely 1-celled capsule (2 mm. long); seeds ovoid, coarsely reticulate, with longitudinally oblong areoles. — Ind. and Ark. Fig. 571.

571. J. monostichus. Inflorescence × 2/3. Fruiting flower × 3.

7. J. secúndus Beauv. Strict (1–8 dm. high); the short flat leaves mostly tufted, rarely more than one third as long as the scapes; sheaths with rounded membranous auricles; inflorescence 3–14 cm. long, the branches closely flowered; sepals erect, barely exceeding the distinctly 3-celled capsule; anthers exceeding the filaments. (*J. tenuis*, var. *secundus* Engelm.) — Sandy or sterile soil, Me. to Vt. and N. C.; also in the Miss. Val. from Tenn. to Ill. and Mo. June–Oct. Fig. 572.

572. J. secundus. Inflorescence × 2/3.

8. J. Dudlèyi Wiegand. Stiff (0.3–1 m. high); leaves about half as long as the scapes; inflorescence 1.5–7 cm. long, the flowers rather closely aggregated, 4–5 mm. long, the segments spreading-ascending, yellowish-green, barely exceeding the imperfectly 1-celled trigonous capsule; filaments slightly exceeding the anthers; seeds 3.5–4.5 mm. long. — Damp or open (mostly calcareous) soil, Que. to Sask. and the Rocky Mts., s. to Pa., Mich., Wisc., Minn., and Kan. June–Sept. Fig. 573.

573. J. Dudleyi. Sheath with auricles × 2.

9. J. dichótomus Ell. Stems rigid (0.4–1 m. high) from a tumid base; leaves filiform, two thirds as long as the scapes, the broad brown or purplish sheaths with rounded cartilaginous auricles; cyme loose or dense (2–8 cm. long), often with 1-sided forked branches, mostly longer than the involucral leaf; flowers greenish brown (3.5–4 mm. long); sepals lanceolate, sharp-pointed, spreading in fruit, as long as the ovoid

574. J. dichotomus. Inflorescence × ⅔.

beaked light mahogany-colored obscurely 1-celled capsule; anthers nearly as long as the filaments. — Low sandy grounds, L. I. to Fla. (Trop. Am.) Fig. 574.

Var. **platyphýllus** Wiegand. Leaves flat or merely involute as in *J. tenuis;* auricles less cartilaginous, often nearly scarious; cyme loose. — Along the coast, Mass. to Tex.

10. **J. setàceus** Rostk. Scape slender (0.3–1 m. high); cyme loose, rather few-flowered; flowers greenish (3–4 mm. long); sepals and petals lanceolate, sharp-pointed, especially the 3 shining sepals; capsule beak-pointed, greenish or light brown; anthers as long as the filaments; style conspicuous; seeds (0.6–0.8 mm. long) irregularly obconic, long-stipitate, ribbed and cross-lined. — Low usually brackish ground, Del. and Mo. to Fla. and La. June–Sept. Fig. 575.

575. J. setaceus. Inflorescence × ⅔. Seed × 25.

11. **J. Vasèyi** Engelm. Stems rigid (2.5–8 dm. high), densely tufted; leaves nearly terete, very slightly channeled on the inner side; cyme 1–4 cm. long, often longer than the involucral leaf; flowers few, often one-sided; capsule oblong, greenish; sepals lanceolate, acute, appressed; anthers as long as the filaments; style very short; seeds slender (1 mm. or more long), the tails half as long as the dark body. — Damp thickets, shores, etc., n. N. B. to Sask., s. to centr. Me., n. N. Y., Mich., Ill., Ia., and Col. July–Aug. Fig. 576.

576. J. Vaseyi. Inflorescence × ⅔. Seed × 40.

577. J. oronensis. Inflorescence × ⅔. Fruiting flower × 3.

12. **J. oronénsis** Fernald. Similar; of paler straw-color throughout; the inflorescence elongate, 2.5–9 dm. long, subdichotomous, the flowers secund and distinct along the secund suberect branches; capsule oblong-trigonous, truncate-emarginate, the sides flat or a little concave toward the tip, much shorter than the sepals; seeds 1 mm. long, the tails ¼ as long as the body. — Thickets, Me., local. Fig. 577.

13. **J. Greènei** Oakes & Tuckerm. Stems rigid (2–8 dm. high); leaves nearly terete, very deeply channeled (almost involute) on the inner side; cyme 1–6 cm. long, usually much shorter than the principal erect involucral leaf, generally dense, the numerous flowers often one-sided (4–5 mm. long); sepals lanceolate, acute, light brown, appressed; anthers as long as the filaments; style very short; seeds ovoid (0.5 mm. long), ribbed and delicately cross-lined. — Sandy or barren soil, Me. to Vt. and N. J.; locally about the Great Lakes. June–Sept. Fig. 578.

578. J. Greenei. Inflorescence × ⅔. Seed × 50.

* * *Inflorescence appearing lateral; the involucral leaf erect, similar to and continuing the naked scape; leaves wanting.*

14. **J. bálticus** Willd., var. **littoràlis** Engelm. Scapes rigid (0.3–1 m. high); cymes loose or dense (1–9 cm. long); flowers chestnut-brown with green; sepals ovate-lanceolate, sharp-pointed, petals obtusish, capsule ellipsoidal, rather triangular, obtuse and mucronate, deep brown; anthers much longer than the broad filaments; style about the length

579. J. balt., v. lit. Inflorescence × ⅔. Fruiting flower × 3.

of the ovary; seeds rather large (about 1 mm. long), nearly obtuse, delicately ribbed and cross-lined. — Sandy (mostly brackish) shores, Nfd. to N. Y. and Pa.; the Great Lakes, and westw. Fig. 579.

15. J. **filifórmis** L. Scape very slender (1.5–6 dm. high), pliant; cyme few-flowered, almost simple; flowers 3 mm. long; sepals lanceolate, petals a little shorter and less acute, mostly longer than the obtuse greenish capsule; anthers shorter than the filaments; style very short; seed (0.5 mm. long) short-pointed at both ends, indistinctly reticulated. — Wet shores and bogs, Nfd. to Sask., Pa., Mich., Rocky Mts., etc. June–Aug. (Eurasia, Patagonia.) Fig. 580.

580. J. filiformis. Inflorescence × ⅔. Seed × 25.

16. J. **effùsus** L. (Common or Soft Rush.) Scape soft and pliant (3–12 dm. high); inner sheaths awned; cyme diffusely much branched, many-flowered; prophyllum below the individual flowers broad-ovate; flowers small (2–2.5 mm. long), greenish; sepals lanceolate, very acute, as long as the narrow triangular-obovoid retuse and pointless greenish-brown capsule; anthers as long as the filaments; style very short; seeds small (0.5 mm. long), with short pale points. — Marshy ground, very common. (Cosmop.) Var. compáctus Lejeune & Courtois. Inflorescence dense, glomerulate. — Less common, except in N. S., where abundant.

17. J. **conglomeràtus** L. Similar to the last; scapes more rigid (3–7 dm. high), distinctly sulcate or even costate below the inflorescence; glomerule 1–2 cm. in diameter; prophyllum lanceolate; flowers about 3 mm. long, brown or greenish; sepals somewhat exceeding the short-mucronate capsule; anthers shorter than the filaments. (*J. Leersii* Marsson). — Ditches, etc., Nfd. and N. S. (Eurasia.)

581. J. Smithii. Inflorescence × ⅔. Seed × 20.

18. J. **Smíthii** Engelm. Scape rather slender (6–9 dm. high); cyme few-flowered, nearly simple; sepals lanceolate, acute; petals a little shorter, obtusish, shorter than the broadly ovoid rather triangular acute deep chestnut-brown capsule; anthers as long as the filaments; style short; seeds large (nearly 1 mm. long), obtuse, short-appendaged at both ends, many-ribbed and reticulated. (*J. gymnocarpus* Coville). — Sphagnous swamps and wet woods, very local, Schuylkill Co., Pa.; Walton Co., Fla. Fig. 581.

§ 2. *Flowers eprophyllate*, i.e. *with only the bractlet at base of the very short pedicel.*

* *Leaves terete, scape-like, not septate.*

19. J. **Roemeriànus** Scheele. Scape stout and rigid (0.5–1.5 m. high), its apex as well as the leaves pungent; cyme compound, open and spreading, brown; 3–6 greenish or light brown flowers (3–3.5 mm. long) in a cluster; sepals lanceolate, sharp-pointed, longer than the obtusish petals; anthers much longer than the broad filaments; styles shorter than the ovary; seeds (0.7 mm. long) very delicately ribbed. — Brackish marshes, N. J. to Fla. and Tex.

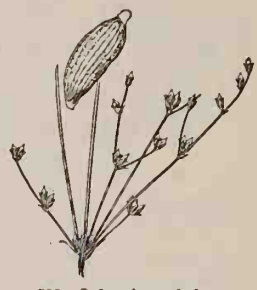
20. J. **marítimus** Lam. Resembling the last, but with a rigid contracted green cyme, an ovary attenuated into a style of nearly its own length, a greenish acute capsule which usually exceeds the acute sepals, and seeds with distinct tails and stronger ribs. — Coney Island, N. Y. (Widely distr.)

** *Leaves nodulose*, i.e. *with septa at regular intervals.*

21. J. **ásper** Engelm. Stems tufted, erect (0.4–1 m. high), terete, stout, rigid, and with the rigid leaves rough; cyme with rigid slightly spreading

582. J. asper.
Part of inflorescence × ⅔.
Seed × 25.

branches, bearing scattered few(2–6)-flowered heads; flowers greenish with brown (4.5 mm. long); sepals ovate-lanceolate, awl-pointed, rigid and strongly nerved, shorter than the similar petals, these a little shorter than the triangular-ovoid beaked incompletely 3-celled brown capsule; ovary tapering into a conspicuous style; seeds large, subcylindric, with white or often reddish appendages. (*J. caesariensis* Coville). — Sphagnous swamps, s. N. J., very local. Aug.–Sept. Fig. 582.



583. J. brachycephalus.
Part of inflorescence × ⅔.
Seed × 18.

22. J. brachycéphalus (Engelm.) Buchenau. Stem slender (2.5–7 dm. high), bearing numerous small 3–5-flowered heads in a large (0.5–2.5 dm. long) spreading cyme; flowers greenish or light brown; sepals shorter than the petals and the brown abruptly short-pointed capsule. (*J. canadensis*, var. Engelm.) — Marshes and wet shores, n. Me. to Wisc., s. to Ct., Pa., and Ill. July–Sept. Fig. 583.

584. J. brevicaudatus.
Inflorescence × ⅔.
Seed × 16.

23. J. brevicaudàtus (Engelm.) Fernald. Stem slender (1.5–7 dm. high), bearing few deep-brown 3–7-flowered heads in a somewhat erect contracted cyme (2.5–15 cm. long); flowers 2.5 mm. long; sepals acute, the petals rarely obtusish, much shorter than the prismatic gradually pointed deep-brown capsule. (*J. canadensis*, vars. *brevicaudatus* and *coarctatus* Engelm.) — Muddy or damp places, Nfd. to Ont., W. Va., and Minn. June–Sept. Fig. 584.

585. J. canadensis.
Part of inflorescence × ⅔.
Seed × 18.

24. J. canadénsis J. Gay. Stems tufted, stout and rigid (4–12 dm. high), bearing in a decompound somewhat spreading cyme the numerous 5–50-flowered heads; flowers greenish or light brown (2.5–3.5 mm. long); sepals and petals awl-pointed, mostly shorter than the abruptly short-pointed capsule; seeds conspicuously tail-pointed. — Marshy places, Nfd. to Minn., Ga., and La. Aug.–Oct. (S. A.) Fig. 585.

586. J. pelocarpus.
Part of inflorescence × ⅔.
Same, proliferous × ⅔.
Flower × 3.

Var. subcaudàtus Engelm. Stem slender, often decumbent (3–9 dm. high), bearing in simpler spreading cymes fewer 8–20-flowered heads; flowers greenish; sepals awl-shaped, but not so rigid; capsule mostly tapering; seeds with short white membranous appendages. — R. I. to Pa. and Ga. — Perhaps specifically distinct.

25. J. pelocárpus Mey. Stems slender (0.5–5 dm. high), bearing few thread-like slightly knotted leaves, branching above into a compound spreading cyme; flowers small (2.5 mm. long), greenish with red; sepals and petals oblong, obtuse, the petals longer, but shorter than the slender taper-beaked 1-celled capsule; style slender; seeds (0.5 mm. long) obovoid, short-pointed. — Sandy, wet or swampy places, Nfd. to N. J., Pa., Minn., and

Ont. Aug., Sept. — The proliferous plants are usually sterile and much larger, with larger diffuse panicles. Fig. 586.

26. **J. súbtilis** Mey. Creeping or floating, capillary, reddish, in water becoming 4 or 5 dm. long, with elongate capillary leaves, on shore forming rosettes (0.5–2 dm. broad) with a tuft of primary leaves (2 or 3 cm. long) and repent branches bearing small fascicles of small leaves and axillary or terminal flowers either sessile or short-peduncled; flowers and capsule much as in preceding, but filaments longer. (*J. pelocarpus*, var. Engelm.) — Margins and shores of ponds and streams, Nfd., Que., and Me. Aug., Sept. Fig. 587.

587. J. subtilis.
Plant × ⅔. Flower × 3.

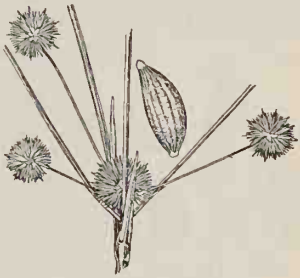
27. **J. bulbòsus** L. Similar, but with hardened bulbous bases, coarser habit, several-flowered glomerules, sharper sepals and petals, and blunt capsule. — Margins and shores of ponds, streams or pools (generally floating). — Lab., Nfd., and N. S. (Eu., n. Afr., Pacific I.) Fig. 588.

588. J. bulbosus.
Inflorescence × ⅔.

28. **J. militàris** Bigel. Stem stout (3.5–9 dm. high), from a thick creeping rootstock, bearing a solitary stout erect leaf (3–7 dm. long) below the middle, which overtops the crowded and rather contracted cyme; heads numerous, 5–12(rarely 25)-flowered; flowers brownish (3 mm. long); sepals and petals lanceolate, the sepals awl-pointed, as long as the narrowly-ovoid triangular taper-beaked 1-celled capsule; anthers longer than the filaments; ovary attenuate into a slender style; seeds (0.6 mm. long) globose-obovoid, obtuse, abruptly pointed. — Margins of ponds and streams, N. S. to n. N. Y. and Ala. — Sometimes producing, in deep water, numberless long capillary submersed leaves from the rootstock. Fig. 589.

589. J. militaris.
Part of inflorescence × ⅔.
Seed × 18.

29. **J. polycéphalus** Michx. Stout (0.5–1.2 m. high), from a stout horizontal rootstock; leaves laterally flattened (3–9 mm. wide); cyme large (1–3 dm. long), spreading, bearing many distant heads (nearly 1 cm. in diameter); flowers 3.5 mm. long; the subulate sepals longer than the similar petals; anthers about as long as the filaments. (*J. scirpoides*, var. Engelm). — Swamps, s. Va. to Fla. and Tex. Fig. 590.



590. J. polycephalus.
Part of inflorescence × ⅔.
Seed × 30.

30. **J. nodòsus** L. Stem erect (1.5–6 dm. high), slender, from a creeping thread-like and tuber-bearing rootstock, mostly with 2 or 3 slender leaves; heads few or several, rarely single, 8–20-flowered (7–11 mm. in diameter), overtopped by the involucral leaf; sepals nearly as long as the slender triangular taper-pointed 1-celled capsule; anthers oblong, shorter than the filaments; style very short; seeds (0.5 mm. long) obovoid, abruptly mucronate. — Swamps and gravelly banks, e. Que. to Sask., s. to Va., Ill., and Neb. July, Aug. Fig. 591.

591. J. nodosus.
Inflorescence × ⅔.

31. **J. Torrèyi** Coville. Similar to the last; stem stouter (0.4–1 m. high), with thick leaves; heads few and large (1–1.5 cm. in diameter), 30–80-flowered; anthers linear, shorter than the filaments. (*J. nodosus*, var. *megacephalus* Torr.) — Low sandy soil, Mass. to Sask., westw. and southw. July–Oct. Fig. 592.

592. J. Torreyi. Inflorescence × ⅔. Fruiting flower × 3.

32. **J. brachycárpus** Engelm. Stem erect (4–9 dm. high), from a thick white horizontal rootstock, bearing about 2 leaves and 2–10 densely flowered spherical heads (7–11 mm. in diameter) in a slightly spreading crowded cyme much exceeding the involucral leaf; flowers pale green (4 mm. long); anthers much shorter than the filaments; style very short; seeds (0.3 mm. long) abruptly apiculate. — Damp light soil, Mass. to N. C.; Ont. to Miss. and Tex. June–Aug. Fig. 593.

593. J. brachycarpus. Inflorescence × ⅔. Fruiting flower × 3.

33. **J. scirpoides** Lam. Stem erect (2.5–9 dm. high), rather slender, from a thick horizontal rootstock, bearing about 2 terete leaves with wide and open sheaths, and a cyme of few or many densely flowered pale green irregularly spherical heads, much longer than the involucral leaf, its branches erect and often elongated; heads (6–13 mm. in diameter) 15–40-flowered; flowers 3–4 mm. long; sepals and petals rigid, awl-shaped and (especially the sepals) bristly-pointed, at length pungent, as long as the stamens and nearly equaling the oblong-triangular taper-pointed 1-celled capsule; anthers very small; style elongated or very short; seeds ovoid, abruptly pointed at each end (0.5 mm. long.) — Wet sandy soil, N. Y. to Fla., Mo., and Tex. July–Sept.

34. **J. megacéphalus** M. A. Curtis. Stouter; leaves terete; branches of the compact cyme short; heads larger, spherical, 40–80-flowered; flowers 4 mm. long; sepals and petals narrower and more sharply pointed, the sepals a little longer than the petals; stamens shorter and anthers longer than in the preceding, and seeds rather smaller and more slender. (*J. scirpoides*, var. *echinatus* Engelm.) — Va. (?) to Fla.

594. J. acuminatus. Inflorescence × ⅔. Fruiting flower × 3. Seed × 25.

35. **J. acuminàtus** Michx. Stems tufted, erect, slender (3–7 dm. high), bearing about 2 leaves and a very loose spreading cyme; heads rather few and large (0.5–1 cm. broad), 5–many-flowered, greenish, at length straw-colored or darker; sepals and petals lance-awl-shaped, sharp-pointed, equal, as long as the ovoid-prismatic short-pointed 1-celled straw-colored or light brown capsule; anthers a little shorter than the filaments; style almost none; seeds small (0.3–0.4 mm. long), acute at both ends, ribbed and reticulated. — N. E. to Ga., Minn., and Tex. May–Aug. — Heads often proliferous in autumn. (Mex.) Fig. 594.

595. J. debilis. Inflorescence × ⅔. Fruiting flower × 3

36. **J. débilis** Gray. Stems slender (2–8 dm. long), flaccid, erect, decumbent, or even rooting at the nodes; heads green, 2–7-flowered, in a loose cyme (0.5–2.5 dm. long); flowers small (2.5 mm. long); capsule oblong-prismatic, short-mucronate. (*J. acuminatus*, var. Engelm.) — Wet sandy soil, R. I. to Mo., and southw. May–Aug. Fig. 595.

37. **J. diffusíssimus** Buckley. Slender and erect (2.5–6 dm. high); heads very numerous, 2–7-flowered, in a very diffuse and loosely dichotomous cyme (1–2.5 dm. long), the branches suberect; flowers greenish or pale brown, 3 mm. long, the

596. J. diffusissimus. Part of inflorescence × ⅔.

linear-subulate sepals and petals subequal; capsule linear-prismatic. — Ind. to Ga. and Tex. June, July. Fig. 596.

38. J. robústus (Engelm.) Coville. Stem stout, tall (0.5–1.2 m.), bearing 2 or 3 long erect distinctly septate leaves, numerous 5–8-flowered light brown heads in a large much branched cyme (1–3 dm. long); ovoid-prismatic capsules scarcely longer than the sepals; seeds fusiform-ovoid. (*J. acuminatus*, var. Engelm.) — Deep swamps, Ill. to La. and Tex. June, July. Fig. 597.

597. J. robustus. Part of inflorescence × ⅔. Seed × 30.

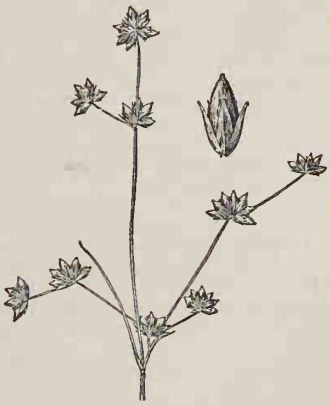
39. J. alpìnus Vill. Stem erect or slightly decumbent (0.5–3.5 dm. high), from a creeping rootstock, with 1 or 2 slender erect leaves; cyme meager (1–15 cm. long), with erect branches bearing distant dark-brown heads, each of 3–10 flowers (2–2.5 mm. long) and usually with one or more flowers elevated on slender pedicels; sepals oblong, obtuse, mucronate or cuspidate and usually longer than the rounded oblong petals, as long as or shorter than the obtuse short-pointed incompletely 3-celled castaneous capsule; anthers as long as the filaments; style short; seeds (0.5 mm. in length) spindle-shaped. — Wet shores and marshes, Arctic Am., s. to Nfd., N. B., n. Me., n. Vt., Oneida Co., N. Y. (*Haberer*), and L. Superior. July, Aug. (Eurasia.) Fig. 598.

598. J. alpinus. Inflorescence × ⅔. Fruiting flower × 3.

Var. insígnis Fries. Similar, usually taller (sometimes 6 dm. high); the flowers greenish or straw-color; the capsule pale brown. (*J. Richardsonianus* Schultes.) — Sandy shores, etc., e. Que. to B. C., s. to centr. Me., Pa., O., Ind., Ill., etc. (Eurasia.)

Var. fuscéscens Fernald. Branches spreading-ascending; glomerules compactly and regularly flowered, only exceptionally with any of the greenish or straw-colored flowers raised on elongate pedicels. — Vt. to B. C. and Mo.

40. J. articulàtus L. Stems (1.5–6 dm. high), tufted from a short creeping rootstock, with 1–3 slender leaves; cyme short (2–9 cm. long), spreading, the crowded heads 3–10-flowered; flowers brown (2.5–3 mm. long); petals a little longer than the sepals, shorter than the slender-conic incompletely 3-celled deep chestnut-brown shining capsule; anthers as long as the filaments; ovary attenuate into a short style; seeds (0.5 mm. long) obovoid, attenuate below, abruptly pointed above. — Wet grounds, Nfd. to N. J., Ont., and Mich. July, Aug. (Eurasia.) Fig. 599.



599. J. articulatus. Inflorescence × ⅔. Fruiting flower × 3.

Var. obtusàtus Engelm. Inflorescence pale, usually larger (sometimes 1.5 dm. long), the green flowers smaller, the abruptly mucronate pale capsule shorter and duller. — Me. to N. J. and Vt., oftenest in brackish soil.

* * * *Leaves flat and grass-like or filiform, not septate.*

41. J. stýgius L. Stems (1–3 dm. high) from slender branching rootstocks, 1–3-leaved below, naked above, the leaves filiform; heads 1–4, of 1–4 flowers,

about the length of the sheathing scarious awl-pointed bract; flowers pale and reddish (3–4 mm. long); sepals lanceolate, acute; petals obtusish, ¾ the length of the trigonous-ovoid acute or acuminate pale capsule (5–6 mm. long), as long as the slender stamens; filaments many times longer than the oblong anthers; recurved stigmas shorter than the style; seeds oblong, with a very loose coat prolonged at both ends (2–2.5 mm. long). — Eurasia.

Var. **americànus** Buchenau. Often taller (1–4.5 dm. high); heads 1 or 2; flowers larger (4.5–5.5 mm. long); the distinctly mucronate-tipped capsule longer (6–9 mm. long); seeds 3–4 mm. long. — Peat-bogs, Lab. and Nfd. to Ont., s. to N. S., Me., N. Y., Mich., and Minn., very local. July, Aug. (E. Prussia.)

600. J. repens. Inflorescence × ⅔.

42. **J. rèpens** Michx. Stems ascending (0.5–2 dm. high) from a fibrous annual root, at length creeping or floating; leaves short, linear, those of the stem nearly opposite and fascicled; heads few in a loose leafy cyme, 3–12-flowered; flowers green (0.5–1 cm. long); sepals and petals rigid, lance-subulate, sepals as long as the linear triangular obtuse capsule, the petals much longer; stamens as long as the sepals; filaments much longer than the oblong anthers; seeds obovoid, slightly pointed, very delicately ribbed and cross-lined. — Miry banks and ditches, Del. to Fla. and La. June–Oct. Fig. 600.

43. **J. marginàtus** Rostk. Stem erect, from a bulbous and stoloniferous base (2–7 dm. high); leaves linear; heads 3–12-flowered, in simple or compound cymes; flowers purplish and green (3.5 mm. long); sepals and petals oblong, the sepals acute and slightly awned, petals longer, mostly obtuse, as long as the subglobose scarcely mucronate capsule; stamens shorter than the sepals, early shriveling; anthers shorter than the filaments; style very short; seeds (about 0.5 mm. long) slender, pointed at both ends and strongly ribbed. — Moist sandy places, Me. to Ont., Neb., and southw. July–Sept. Fig. 601.

601. J. marginatus Inflorescence × ⅔. Fruiting flower × 3.

Var. **setòsus** Coville. Similar to the species, but with lance-attenuate aristate petals. — Kan. to La. and Tex.

602. J. aristulatus. Fruiting flower × 3.

44. **J. aristulàtus** Michx. Coarser (0.4–1 m. high); the larger inflorescence (0.5–2 dm. high) with abundant 2–5-flowered brown heads; stamens equaling or exceeding the sepals, persistent and usually exserted in fruit. (*J. marginatus*, var. *biflorus* Engelm.) — Wet sandy barrens, Mass. to Mich., and southw., mostly near the coast. Fig. 602.

2. LÙZULA DC. Wood Rush

Capsule 1-celled, 3-seeded, 1 seed to each parietal placenta. — Perennials, often hairy, usually in dry ground, with flat and soft usually hairy leaves, and spiked, crowded, or umbeled flowers. (From *Gramen Luzulae*, or *Luxulae*, diminutive of *lux*, light, — a name given to one of the species from its shining with dew.) Juncoides [Dill.] Adans. Juncodes Ktze.

a. Flowers solitary at the tips of the ultimate branches of the inflorescence.
  Inflorescence an umbel, the filiform peduncles 1(rarely 2)-flowered; flowers 3–4.5 mm. long . . . . . 1. *L. saltuensis.*
  Inflorescence a loose decompound cyme; flowers 2 mm. long . . . 2. *L. parviflora.*
a. Flowers crowded in spikes or glomerules *b.*
  b. Flowers white . . . . . 3. *L. nemorosa.*
  b. Flowers brown or straw-colored (rarely green in shade) *c.*
    c. Flowers in dense nodding spike-like panicle . . . . . 5. *L. spicata.*
    c. Flowers in mostly peduncled glomerules *d.*
      d. Leaves flat, with blunt callous tips; bracts at base of the flowers entire or merely lacerate.
        Flowers castaneous . . . . . (6) *L. campestris*, v. *frigida.*
        Flowers ferruginous, pale brown or yellowish.
          Rays all strongly ascending . . . . . 6. *L. campestris*, v. *multiflora.*
          Rays (or some of them) strongly divergent . . (6) *L. campestris*, v. *bulbosa.*
      d. Leaves with involute subulate tips; bracts at base of flowers ciliate-fimbriate . . . . . 4. *L. confusa.*

1. **L. saltuénsis** Fernald. Plant loosely caespitose, often stoloniferous, 1–4 dm. high; leaves lance-linear, hairy, the basal 0.5–1 cm. wide; umbel mostly simple, the peduncles loosely ascending or spreading; sepals and petals broadly lanceolate, pale brown or straw-colored, with hyaline margins, shorter than the conic-ovoid pointed capsule; seeds with a long curved appendage. (*L. vernalis* Man. ed. 6, not DC.; *J. pilosum* Coville, not Ktze.) — Woods and banks, Nfd. to Sask., N. Y., Mich., and Minn., and in the mts. to Ga. Apr., May. (E. Asia.)

2. **L. parviflòra** (Ehrh.) Desv. Nearly smooth (1.5–9 dm. high); leaves broadly linear, the basal 7–13 mm. wide; *corymb decompound, loose; pedicels drooping;* sepals pointed, straw-color, about the length of the minutely pointed and brown (tardily black) capsule; seeds not appendaged. (*L. spadicea*, var. *melanocarpa* Mey.) — Low woods and mountain slopes, Lab. to Alaska., s. to N. B., Me., White Mts., w. Mass., n. N. Y., Great Lakes; and in the Rocky Mts. June, July. (Eurasia.)

3. **L. nemoròsa** (Poll.) Mey. Loosely caespitose (4–8 dm. high); leaves long, linear, erect, more or less hairy, the basal 3–5 mm. wide; inflorescence diffusely corymbiform, 3–15 cm. long, the ultimate branchlets terminated by 3–8-flowered glomerules; sepals and petals lanceolate, acute, the sepals distinctly shorter, about equaled by the apiculate-beaked trigonous-ovoid dark capsule. — Open woods, Riverdale, N. Y.; Niagara Falls, Ont. June, July. (Introd. from Eu.)

4. **L. confùsa** Lindeberg. Caespitose (0.5–3 dm. high); leaves linear, channeled; spikes 1–5, on unequal ascending or rarely recurved peduncles, ovoid, chestnut-brown, the largest 5–8 mm. thick; sepals taper-pointed, longer than the obtuse capsule; seeds not appendaged. (*L. arcuata* Man. ed. 6, not Mey.; *L. hyperborea* R. Br., in part.) — Alpine summits, Me., N. H., and far northw. July, Aug. (Eurasia.)

5. **L. spicàta** (L.) DC. Densely caespitose (1–5 dm. high); *leaves channeled,* narrowly linear; *flowers in sessile clusters, forming an interrupted spiked panicle,* brown; sepals bristle-pointed, scarcely as long as the abruptly short-pointed capsule; seeds merely with a roundish projection at base. — Alpine regions, N. E. and n. N. Y., and far northw. June–Aug. (Eurasia.)

6. **L. campéstris** (L.) DC. Loosely caespitose and strongly stoloniferous (0.5–2 dm. high); leaves linear, flat, hairy; spikes 2–6, globose (6–7 mm. thick), irregularly umbeled, 1 or 2 subsessile, the others on wide-spreading or decurved peduncles; flowers castaneous, 3 mm. long; sepals bristle-pointed, longer than the obtuse capsule; seeds with a conical appendage at base. — Eurasia.

Var. **multiflòra** (Ehrh.) Čelak. Densely caespitose (1.5–6 dm. high); spikes 3–12, subglobose or subcylindric (5–6 mm. thick), mostly on ascending or erect simple or slightly forked peduncles (sometimes congested); the ferruginous or pale brown (rarely green) calyx 2.5–3 mm. long, often equaled by the capsule. (*L. campestris* Am. auth., not DC.) — Fields, meadows, and open woods, very common, Nfd. to the Pacific, s. to Pa., Great Lakes, etc. Apr.–July. (Eurasia.)

Var. **frígida** Buchenau. Similar to var. *multiflora*, but with the subglobose short-peduncled heads castaneous or nearly black. — Lab. and Nfd. to N. B. and Me. (N. Eu.)

Var. **bulbòsa** A. Wood. Somewhat resembling var. *multiflora*, but with some or all of the rays divergent, and the base sometimes but not always producing small bulblets. (*Juncoides* Small.) — Woods, generally near streams, D. C. to Ind., Kan., and southw.

LILIÀCEAE (Lily Family)

Herbs, or rarely woody plants, with regular and symmetrical almost always 6-androus flowers; the perianth not glumaceous, free from the chiefly 3-celled ovary; the stamens 1 *before each of its divisions or lobes* (*i e.* 6, in one instance 4), *with 2-celled anthers; fruit a few–many-seeded pod or berry; the small embryo inclosed in copious albumen* Seeds anatropous or amphitropous

(orthotropous in *Smilax*). Flowers not from a spathe, except in *Allium;* the outer and inner ranks of the perianth colored alike (or nearly so) and generally similar, except in *Trillium.*

Tribe I. NARTHECÌEAE. Flowers perfect, small, spicate-racemose. Perianth of 6 distinct segments. Style none; stigma small, slightly lobed or undivided. Fruit a loculicidal capsule.

1. **Narthecium.** Filaments woolly. Perianth-segments linear-lanceolate, yellowish. Capsule short-cylindric, attenuate, many-seeded.

Tribe II. HELONÌEAE. Flowers (small) perfect or dioecious, racemo-spicate. Perianth of 6 distinct segments. Styles 3, distinct. Fruit a loculicidal capsule.

2. **Xerophyllum.** Flowers perfect. Seeds 2 in each cell.
3. **Helonias.** Flowers perfect. Seeds many in each cell, linear and with a tapering appendage at each end.
4. **Chamaelirium.** Flowers dioecious. Seeds numerous, somewhat wing-appendaged at the ends.

Tribe III. VERÀTREAE. Flowers perfect or polygamously monoecious. Perianth of 6 nearly or quite distinct segments. Styles 3, distinct. Fruit a septicidal capsule.

5. **Tofieldia.** Flowers perfect. Anthers 2-celled. Leaves 2-ranked, equitant.
6. **Amianthium.** Flowers perfect. Anthers confluently 1-celled. Leaves several-ranked. Perianth-segments glandless.
7. **Stenanthium.** Flowers polygamous. Perianth-segments lanceolate, acuminate, glandless. Stem from a bulbous base.
8. **Zygadenus.** Flowers perfect or monoecious. Leaves several-ranked, linear. Perianth-segments glandular at the base, ovate or oblong. Stem glabrous.
9. **Melanthium.** Flowers polygamo-monoecious. Stem pubescent above, from a running root-stock. Perianth-segments free from the ovary, their long claws adnate to the filaments.
10. **Veratrum.** Flowers polygamo-monoecious. Stem pubescent above, from a running root-stock. Perianth-segments without claws, slightly adnate to the ovary.

Tribe. IV. UVULARÌEAE. Flowers perfect. Perianth-segments distinct. Style 3-cleft to below the middle. Fruit a loculicidal capsule. Flowers terminal or axillary. Stem leafy.

11. **Uvularia.** Stem terete. Leaves perfoliate. Flowers terminal. Capsule truncate, 3-lobed.
12. **Oakesia.** Stem angled. Leaves sessile but not perfoliate. Flowers appearing opposite the leaves. Capsule rounded or more or less pointed at the summit, acutely 3-winged.

Tribe V. ALLÌEAE. Flowers perfect, umbellate. Perianth-segments 6, nearly or quite distinct, 1-nerved. Style single, long; stigma uncleft, or only slightly 3-lobed. Fruit a loculicidal capsule. Seeds few (1–7) in each cell.

13. **Allium.** Seeds 1–2 in each cell. Plants with a strong odor.
14. **Nothoscordum.** Seeds several in each cell. Plants without strong odor.

Tribe VI. HEMEROCALLÍDEAE. Flowers perfect. Perianth-segments united below the middle into a funnel-shaped tube, not conspicuously roughened. Style single, long, declined, not cleft. Fruit a loculicidal capsule.

15. **Hemerocallis.** Flowers large. Perianth yellow or brownish-red.

Tribe VII. LILÌEAE. Flowers perfect. Perianth-segments distinct, petaloid. Style single, elongated, uncleft. Fruit a loculicidal capsule. Seeds numerous in each cell. Stem from a scaly bulb or from a corm.

16. **Lilium.** Stem leafy, from a scaly bulb. Seeds flattened.
17. **Erythronium.** Stem a scape from a solid bulb. Leaves 2, basal. Seeds obovoid.

Tribe VIII. SCÍLLEAE. Flowers perfect. Perianth-segments distinct and 3–several-nerved, or united into an urceolate short-toothed tube, not roughened externally. Style single, slender, uncleft. Fruit a loculicidal capsule. Stem scapose from a tunicate bulb.

18. **Camassia.** Flowers light blue, long-racemose. Filaments filiform. Perianth-segments distinct.
19. **Ornithogalum.** Flowers greenish-white, subcorymbose. Filaments dilated. Perianth-segments distinct.
20. **Muscari.** Flowers blue. Perianth gamophyllous, globose-urceolate; limb short-toothed.

Tribe IX. YÚCCEAE. Flowers perfect, racemo-paniculate. Perianth campanulate; its segments (large) distinct or somewhat connate near the base. Fleshy 3-lobed stigmatophore nearly or quite sessile. Fruit a loculicidal capsule. Cells many-seeded.

21. **Yucca.** Leaves sword-shaped, rigid.

Tribe X. POLYGONÀTEAE. Flowers perfect. Style single, entire or shortly 3-cleft at the summit. Fruit a berry.

* Proper leaves reduced to scarious scales, the apparent (phyllodial) leaves filiform.

22. **Asparagus.** Stem excessively branched. Flowers small, axillary.

* * Leaves neither scale-like nor filiform.

+ Perianth-segments distinct.

23. **Clintonia.** Scapose. Flowers umbellate or subumbellate.
24. **Smilacina.** Leafy-stemmed. Flowers 6-parted, racemose or paniculate.
25. **Maianthemum.** Low; stem 1–3-leaved. Flowers 4-parted.
26. **Disporum.** Leafy-stemmed. Flowers few in terminal umbels.
27. **Streptopus.** Leafy-stemmed. Flowers axillary on bent pedicels.

+ + Perianth-segments connate.

28. **Polygonatum.** Stem leafy. Peduncles axillary, 1–8-flowered. Perianth cylindrical.
29. **Convallaria.** Leaves sheathing the scape. Flowers racemose. Perianth bell-shaped.

Tribe XI. PARÍDEAE. Flowers perfect. Perianth-segments distinct. Style-branches distinct. Fruit a berry. Cauline leaves whorled.

30. **Medeola.** Cauline leaves in 2 whorls. Flowers umbellate. Styles filiform.
31. **Trillium.** Cauline leaves 3 in a single whorl. Styles short, thick, the stigmatic surface irregular.

Tribe XII. ALÈTREAE. Flowers perfect. Perianth (small, white or yellow) gamophyllous, conspicuously roughened. Style single, slightly cleft at the summit. Ovary partly inferior. Fruit a loculicidal many-seeded capsule.

32. **Aletris.** Scapose. Flowers in a spicate raceme.

Tribe XIII. SMILÀCEAE. Flowers dioecious, umbellate. Fruit baccate. Leaves net-veined. Tendrils usually present.

33. **Smilax.** Perianth-segments distinct, deciduous, small, greenish or yellowish.

Artificial Key to Genera

a. Flowers dioecious.
  Inflorescence umbellate; fruit a berry . . . . . 33. Smilax.
  Inflorescence a spicate raceme; fruit a pod . . . . . 4. Chamaelirium.
a. Flowers perfect or monoecious *b.*
  b. Perianth gamophyllous, urceolate or campanulate, with a shortly toothed limb.
    Stem leafy; leaves ovate, oblong, or lanceolate . . . . . 28. Polygonatum.
    Stem scapoid, leafy only at the base.
      Leaves oblong; perianth white. . . . . 29. Convallaria.
      Leaves very narrow, lanceolate to linear or terete.
        Perianth smooth, blue . . . . . 20. Muscari.
        Perianth roughened, white or yellow . . . . . 32. Aletris.
  b. Perianth cleft at least to the middle or divided to the base *c.*
    c. Fruit a berry *d.*
      d. Cauline leaves whorled.
        Cauline leaves 3, in a single involucre-like whorl . . . . 31. Trillium.
        Cauline leaves in 2 whorls . . . . . 30. Medeola.
      d. Cauline leaves alternate or none.
        Leaves all basal . . . . . 23. Clintonia.
        Leafy-stemmed.
          Real leaves scale-like; apparent leaves filiform . . . . 22. Asparagus.
          Leaves foliaceous, never filiform.
            Flowers 4-parted . . . . . 25. Maianthemum.
            Flowers 6-parted.
              Flowers racemose or paniculate . . . . . 24. Smilacina.
              Flowers umbellate . . . . . 26. Disporum.
              Flowers axillary, solitary or in pairs . . . . . 27. Streptopus.
    c. Fruit a capsule *e.*
      e. Style none or very short and fleshy. (See also *Tulipa*, p. 289)
        Flowers small; leaves distichous . . . . . 1. Narthecium.
        Flowers large; leaves several-many-ranked . . . . . 21. Yucca.

e. Style or styles filiform *f.*
f. Style single, entire or more or less deeply parted *g.*
g. Style 3-parted to below the middle.
Leaves perfoliate . . . . . 11. UVULARIA.
Leaves sessile, not perfoliate . . . . . 12. OAKESIA.
g. Style entire or slightly 3-lobed at the summit *h.*
h. Stem rhizomatose at the base . . . . . 15. HEMEROCALLIS
h. Stem bulbous at the base *i.*
i. Bulb solid (a corm); leaves 2, basal . . . . . 17. ERYTHRONIUM.
i. Bulb scaly; stem leafy . . . . . 16. LILIUM.
i. Bulb tunicate.
Perianth-segments 1-nerved.
Herbage with the odor of onion . . . . . 13. ALLIUM.
Herbage without strong odor . . . . . 14. NOTHOSCORDUM
Perianth-segments 3–several-nerved.
Perianth blue; filaments thread-like . . . . 18. CAMASSIA.
Perianth greenish-white; filaments broad . . . 19. ORNITHOGALUM.
f. Styles 3, distinct to the base *j.*
j. Stigmas linear.
Perianth-segments purplish; seeds many in each cell . . 3. HELONIAS.
Perianth-segments white; seeds 2 in each cell . . . 2. XEROPHYLLUM.
j. Stigmas terminal.
Anthers 2-celled . . . . . 5. TOFIELDIA.
Anthers confluently 1-celled.
Stem pubescent.
Perianth-segments clawed . . . . . 9. MELANTHIUM.
Perianth-segments essentially sessile . . . . 10. VERATRUM.
Stem glabrous.
Perianth-segments glandular near the base . . . 8. ZYGADENUS.
Perianth-segments not glandular.
Flowers polygamous . . . . . 7. STENANTHIUM.
Flowers perfect . . . . . 6. AMIANTHIUM.

1. NARTHÈCIUM [Möhring] Juss. BOG ASPHODEL

Sepals 6, linear-lanceolate, yellowish, persistent. Anthers linear, introrse. Seeds ascending, appendaged at each end with a long bristle-form tail. — Rootstock creeping, bearing linear equitant leaves, and a simple stem or scape terminated by a simple dense bracteate raceme; pedicels bearing a linear bractlet. (Name an anagram of *Anthericum*, from ἀνθέρικος, supposed to have been the Asphodel.)

1. **N. americànum** Ker. Stem 2.5–4 dm. high; leaves 0.7–1.5 mm. wide, 7–9-nerved; raceme dense (2–5 cm. long); perianth-segments narrowly linear (4–5 mm. long), scarcely exceeding the stamens. (*Abama* Morong.) — Sandy bogs, pine-barrens of N. J. June, July.

2. XEROPHÝLLUM Michx.

Perianth widely spreading; sepals petal-like (white), oval, distinct, without glands or claws, 5–7-nerved, at length withering, about the length of the awl-shaped filaments. Anthers 2-celled, short, extrorse. Styles thread-like, stigmatic down the inner side, persistent. Capsule globular, 3-lobed, obtuse (small). Seeds collateral, 3-angled, not margined. — Herb with the stem simple, from a thick tuberous rootstock, bearing a simple dense bracteate raceme of showy flowers, and thickly beset with needle-shaped leaves, the upper reduced to bristle-like bracts; those from the root in a dense tuft, reclined, rough on the margin, dry and rigid. (Name from ξηρός, *arid*, and φύλλον, *leaf*.)

1. **X. asphodeloìdes** (L.) Nutt. Stem 3–12 dm. high. (*X. setifolium* Michx.) — Pine-barrens, N. J. to e. Tenn., and Fla. June.

3. HELÒNIAS L.

Perianth of 6 spatulate-oblong purple segments, persistent, several-nerved, glandless, turning green, shorter than the thread-like filaments. Anthers 2-celled, roundish-oval, blue, extrorse. Styles revolute, stigmatic down the inner side, deciduous. Capsule obcordately 3-lobed, loculicidally 3-valved; the valves divergently 2-lobed. — A smooth perennial, with many oblong-spatulate

or oblanceolate evergreen flat leaves, from a tuberous rootstock, producing in early spring a stout hollow sparsely bracteate scape (3–6 dm. high), sheathed with broad bracts at the base, and terminated by a simple and short dense raceme. Bracts obsolete; pedicels shorter than the flowers. (Name probably from ἕλος, *a swamp*, the place of growth.)

1. **H. bullàta** L. — Wet places, s. N. Y., and e. Pa. to Va., rare and local.

4. CHAMAELÍRIUM Willd. Devil's Bit

Perianth of 6 spatulate-linear (white) spreading 1-nerved sepals, withering-presistent. Filaments and (white) anthers, as in *Helonias;* fertile flowers with rudimentary stamens. Styles linear-club-shaped, stigmatic along the inner side. Capsule ellipsoid, not lobed, of a thin texture, loculicidally 3-valved from the apex. Seeds linear-oblong. — Smooth herb, with a wand-like stem from a (bitter) thick and abrupt tuberous rootstock, terminated by a wand-like spiked raceme (1–3 dm. long) of small bractless flowers; fertile plant more leafy than the staminate. Leaves flat, lanceolate, the lowest spatulate, tapering into a petiole. (Name formed of χαμαί, *on the ground*, and λείριον, *lily*, the genus having been founded on a dwarf undeveloped specimen.)

1. **C. lùteum** (L.) Gray. (Blazing Star.) Stem 3–12 dm. high; fruiting *pedicels* 1–5 *mm. long; capsule* 7–10 *mm. long.* (*C. carolinianum* Willd.) — Low grounds, w. Mass. to Fla., w. to Mich., Neb., and Ark. June.

2. **C. obovàle** Small. Similar; flowers larger; fruiting *pedicels about equaling the larger* (12–14 *mm. long*) *capsules.* — Woods, N. Y., N. J.; and in the mts. from W. Va. to N. C. and Ala. — Species not seen.

5. TOFIÈLDIA Huds. False Asphodel

Perianth more or less spreading, persistent; the sepals (white or greenish) concave, oblong or obovate, without claws, 3-nerved. Filaments awl-shaped; anthers short, innate or somewhat introrse, 2-celled. Styles awl-shaped; stigmas terminal. Seeds oblong, horizontal. — Slender perennials, mostly tufted, with short or creeping rhizomes, and simple stems leafy only at the base, bearing small flowers in a close raceme or spike. Leaves 2-ranked, equitant, linear, grass-like. (Named for *Mr. Tofield*, an obscure English botanist of the 18th century.)

* *Glabrous; pedicels solitary, in a short raceme or head; seeds not appendaged.*

1. **T. palústris** Huds. Scape leafless or nearly so (6–19 cm. high), slender, bearing a globular or subcylindric head or short raceme of whitish flowers; leaves tufted, 2–4 cm. long. — Gaspé Co., Que., to Minn., and northw. (Greenl., Eu.)

* * *Stem and inflorescence pubescent; pedicels fascicled in threes; seeds caudate.*

2. **T. glutinòsa** (Michx.) Pers. Stem (1.5–4.5 dm. high) and *pedicels* very *glutinous with dark glands;* leaves broadly linear, short; perianth not becoming rigid; capsule thin; seeds with a contorted tail at each end. — Moist grounds, Nfd. to centr. Me., Ill., Minn., northw. and westw.; also s. in the Alleghenies. June, July.

3. **T. racemòsa** (Walt.) BSP. Stem (3–9 dm. high) and pedicels *roughened with minute glands;* leaves longer and narrower; perianth rigid about the firm capsule; seeds with a short white appendage at each end. (*T. pubens* Michx.) — Pine-barrens, N. J. to Fla. and Ala. July.

6. AMIÁNTHIUM Gray. Fly Poison

Perianth widely spreading; the free white segments oval or obovate, without claws or glands, persistent. Filaments capillary. Anthers, capsules, etc., nearly as in *Melanthium.* Styles thread-like. Seeds 1–4 in each cell. — Glabrous, with simple stems from a bulbous base or coated bulb, scape-like, few-leaved, terminated by a simple dense raceme of handsome flowers, turning greenish with age. (From ἀμίαντος, *unspotted*, and ἄνθος, *flower;* a name formed with more regard to euphony than to good construction, alluding to the glandless perianth.)

1. **A. muscaetóxicum** (Walt.) Gray. (Fly Poison.) *Leaves broadly lineur*, elongated, obtuse (4–27 mm. wide); *raceme simple;* capsule abruptly 3-horned. seeds oblong with a fleshy red coat. (*Chrosperma* Ktze.) — Open woods, L. I. to Fla., w. to Ky. and Ark. June, July.

7. STENÁNTHIUM (Gray) Kunth.

Perianth spreading; the sepals narrowly lanceolate, tapering to a point from the broader base, where they are coherent to the base of the ovary, much longer than the short stamens. Seeds nearly wingless. — Smooth, with a wand-like leafy stem from a bulbous base, long and grass-like conduplicate-keeled leaves, and numerous small flowers in compound racemes, forming a long terminal panicle; flowering in summer. (Name composed of στενός, *narrow*, and ἄνθος, *flower*, from the slender sepals and panicles.)

1. **S. gramíneum** (Ker) Kunth. Stem leafy (1–1.6 m. high), *slender; leaves 4–10 mm. broad;* panicle elongated, very open, with slender flexuous branches or subsimple; flowers nearly sessile or the fertile on short pedicels; sepals linear-lanceolate (white), 4–8 mm. long; capsule mostly reflexed, narrowly oblong-ovate, with spreading beaks. (*S. angustifolium* Kunth.) — In the Alleghenies from Va. to Ga., westw. to Mo. S. robústum Wats., separated on its stouter habit, dense panicle, broader leaves, and erect capsule, is doubtfully distinct.

8. ZYGÁDENUS Michx.

Flowers perfect or polygamous. Perianth withering-persistent, spreading; the petal-like oblong or ovate sepals 1–2-glandular near the more or less narrowed but not unguiculate base. Stamens free from the sepals and about their length. Anthers, styles, and capsule nearly as in *Melanthium*. Seeds angled, rarely at all margined. — Smooth and somewhat glaucous perennials, with rather large panicled greenish-white flowers in summer. (Name composed of ζυγός, *a yoke*, and ἀδήν, *a gland*, the glands being sometimes in pairs.)

* *Stem from a creeping rootstock; 2 conspicuous orbicular glands on each division of the perianth above the claw.*

1. **Z. glabérrimus** Michx. Stems 3–9 dm. high; leaves grass-like, channeled, conspicuously nerved, elongated, tapering to a point; panicle pyramidal, many-flowered; flowers perfect; sepals nearly free (12 mm. long), ovate, becoming lance-ovate, with a short claw. — Grassy low grounds, Va. to Fla. and Ala.

* * *Stem from a more or less bulbous base; glands less obvious, covering the base of the perianth-segments.*

2. **Z. chloránthus** Richards. Stem 3–9 dm. high; leaves flat, carinate; raceme simple or sparingly branched and few-flowered; bracts ovate-lanceolate; base of the *perianth coherent with the base of the ovary*, the thin ovate or obovate *sepals marked with a large obcordate gland*, the inner abruptly contracted to a broad claw. (*Z. elegans* of auth., not Pursh.) — Calcareous soils. Gaspé Co., Que., to Man., southw. to n. N. B., n. Vt., n. N. Y., n. O., n. Ill., and (?) Mo.

3. **Z. Nuttállii** Gray. Like the last; raceme rather densely flowered, with narrow bracts; *perianth free; sepals with an ill-defined gland at base*, not at all clawed; seeds larger (6 mm. long). — Kan. to Tex.

4. **Z. leimanthoìdes** Gray. Stem 7–15 dm. high, slender; leaves narrowly linear; flowers small (8 mm. in diameter) and numerous, in a few crowded panicled racemes; *only a yellowish spot on the contracted base of each division of the free perianth.* — Low grounds, pine-barrens, L. I. to Ga.

9. MELÁNTHIUM L.

Perianth of 6 separate and free widely spreading somewhat heart-shaped or oblong and halberd-shaped or oblanceolate sepals, raised on slender claws, cream-colored or greenish. Filaments shorter than the divisions of the perianth.

adhering to their claws often to near the summit, persistent. Anthers heart-shaped or kidney-shaped, confluently 1-celled, shield-shaped after opening, extrorse. Capsule ovoid-conical, 3-lobed, of 3 inflated membranaceous several-seeded carpels; seeds flat, broadly winged. — Stems tall and leafy, from a thick rootstock, roughish-downy above, as well as the open and ample pyramidal panicle (composed chiefly of simple racemes), the terminal part mostly fertile. Leaves linear to oblanceolate or oval, not plaited. (Name composed of *μέλας*, *black*, and *ἄνθος*, *flower*, from the darker color which the persistent perianth assumes after blossoming.)

* *Perianth-divisions with a conspicuous double gland at the summit of the claw.*

1. **M. virginicum** L. (Bunch-flower.) Stem 8–16 dm. high, leafy, rather slender; *leaves linear* (1–3 cm. wide); divisions of the perianth flat, ovate to oblong or slightly hastate (5–8 mm. long); capsule 1.4 cm. long; seeds 10 in each cell, 4–6 mm. long. — Wet meadows, "R. I.," N. Y. to Minn., Tex., and Ga.

2. **M. latifòlium** Desr. *Leaves* more *oblanceolate*, often 5 cm. broad; divisions of the perianth undulate (5 mm. long), the very narrow claw nearly equaling the orbicular or ovate blade; capsule 12–16 mm. long, on pedicels 8–18 mm. in length; seeds 4–8 in each cell, 6–8 mm. long. (*M. racemosum* Michx.) — Ct. to S. C.

Var. **longipedicellàtum** A. Brown. Leaves somewhat narrower; pedicels 2–2.5 cm. long. — Wooded slopes, w. Va. (*Judge Brown*).

* * *Perianth-divisions oblanceolate, without glands.*

3. **M. parviflòrum** (Michx.) Wats. Stem rather slender (0.6–1.6 m. high), sparingly leafy, naked above; leaves oval to oblanceolate (5–10 cm. wide), on long petioles; perianth-divisions 4-6 mm. long, oblanceolate or spatulate, those of the sterile flowers on claws; stamens very short; capsule 1.5 cm. long; seeds 4–6 in each cell, 5 mm. long. (*Veratrum* Michx.) — In the Alleghenies, Va. to S. C.

10. VERÀTRUM [Tourn.] L. False Hellebore

Perianth of 6 spreading and separate obovate-oblong (greenish or brownish) divisions, more or less contracted at the base (but not clawed), nearly free from the ovary, not gland-bearing. Filaments free from and shorter than the sepals, recurving. Anthers, pistils, fruit, etc., nearly as in *Melanthium*. — Somewhat pubescent perennials, with simple stems from a thickened base producing coarse fibrous roots (very poisonous), 3-ranked plaited and strongly veined leaves, and racemed-panicled dull or dingy flowers; in summer. (Name from *vere*, truly, and *ater*, black.)

1. **V. viride** Ait. (American White Hellebore, Indian Poke.) *Stem stout, very leafy* to the top (6–20 dm. high): *leaves broadly oval*, pointed, *sheath-clasping; panicle pyramidal*, the *dense spike-like racemes* spreading; *perianth yellowish-green*, moderately spreading, *the segments ciliate-serrulate; ovary glabrous;* capsule many-seeded. — Swamps and low grounds.

2. **V. Woódii** Robbins. *Stem slender, sparingly leafy* (8–14 dm. high); *leaves oblanceolate*, only the lowest sheathing; *panicle very narrow; perianth greenish-purple, with entire segments; ovary tomentose*, soon glabrate; capsule few-seeded. — Woods and hilly barrens, s. Ind. to Mo.

11. UVULÀRIA L. Bellwort

Perianth narrowly bell-shaped, lily-like, deciduous; the 6 divisions spatulate-lanceolate, acuminate, obtusely gibbous at base, with a deep honey-bearing groove within bordered on each side by a callus-like ridge. Stamens much shorter, barely adherent to their base. Capsule truncate, coriaceous, 3-lobed, loculicidal at the summit. Seeds few in each cell, obovoid, with a thin white aril. — Stems terete, from a short rootstock with fleshy roots, naked or scaly at base, forking above, bearing oblong perfoliate flat and membranaceous leaves

with smooth margins, and yellowish drooping flowers, in spring, solitary on terminal peduncles. (Name "from the flowers hanging like the *uvula*, or palate.")

1. **U. perfoliàta** L. *Glaucous throughout*, 2–5 dm. high, with 1–3 leaves below the fork; *leaves glabrous*, oblong- to ovate-lanceolate, acute; *perianth-segments granular-pubescent within* (1.8–3.6 cm. long); *stamens shorter than the styles; tip of the connective acuminate;* cells of the capsule with 2 dorsal ridges and 2-beaked at the apex. — Rich woods, e. Mass. to Ont., Dak. and southw.

2. **U. grandiflòra** Sm. Yellowish green, *not glaucous;* stem naked or with a single leaf below the fork; *leaves whitish-pubescent beneath*, usually somewhat acuminate; *perianth-segments smooth within* or nearly so (2.5–4.5 cm. long); *stamens exceeding the styles, obtusely tipped;* capsule obtusely lobed. (*U. flava* Sm.) — Rich woods, w. N. H. to Ga., westw. to Minn. and Kan.

12. OAKÈSIA Wats.

Flowers resembling those of *Uvularia*, but the segments obtuse or acutish, carinately gibbous and without ridges within. Capsule membranous, elliptical, acutish at each end or shortly stipitate, triquetrous and acutely winged, very tardily dehiscent. Seeds globose, with a very tumid spongy rhaphe. — Stem acutely angled, from a slender creeping rootstock, with sessile clasping leaves scabrous on the margin, and 1 or 2 flowers terminal on slender peduncles but soon appearing opposite the leaves by the growth of the branches. (Dedicated to *William Oakes*, New England botanist, 1799–1848.)

1. **O. sessilifòlia** (L.) Wats. *Leaves* lance-oblong, *acute at each end*, pale, *glaucous* beneath, sessile or partly clasping; divisions of the perianth 1.4–2.5 cm. long; anthers obtuse; capsule short-stipitate, 1.2–2 cm. long. (*Uvularia* L.) — Woods and thickets.

2. **O. pubérula** (Michx.) Wats. Slightly puberulent; *leaves bright green both sides* and shining, oval, *mostly rounded at base*, with rougher edges; styles separate to near the base, not exceeding the acute anthers; capsule not stipitate, 2–2.5 cm. long. (*Uvularia* Michx.; *O. sessilifolia*, var. *nitida* Britton.) — Pine-barren swamps and mountain woods, N. J. to S. C.

13. ÁLLIUM [Tourn.] L. Onion. Garlic

Perianth of 6 entirely colored sepals, which are distinct, or united at the very base, 1-nerved, often becoming dry and scarious and more or less persistent; the 6 filaments awl-shaped or dilated at base. Style persistent, thread-like; stigma simple or only slightly 3-lobed. Capsule lobed, loculicidal, 3-valved, with 1–2 ovoid-kidney-shaped amphitropous or campylotropous black seeds in each cell. — Strong-scented and pungent herbs; the leaves and usually scapose stem from a coated bulb; flowers in a simple umbel, some or all of them frequently replaced by bulblets; spathe scarious, 1–2-valved. (The ancient Latin name of the Garlic.)

Ovary not crested.
- Capsule strongly 3-lobed, cells 1-ovuled; leaves elliptic-lanceolate, 2–5 cm. broad . . . . . 1. *A. tricoccum.*
- Capsule ovoid to obovoid, slightly lobed; cells 2–several-ovuled; leaves linear or terete.
  - Umbel capitate; the pedicels shorter than or little exceeding the perianth . . . . . 2. *A. Schoenoprasum.*
  - Umbel open (except when as in *A. canadense* and *A. vineale* the flowers are more or less replaced by sessile bulblets); the pedicels much exceeding the perianth.
    - Stem leafy to or above the middle; bulb-coats fibro-membranous, not strongly reticulated . . . . . 8. *A. vineale.*
    - Stem leafy only near the base; bulb-coats in age strongly netted.
      - Umbel few-flowered, nearly always converted partially or wholly into an ovoid inclosed head of bulblets . . . . . 6. *A. canadense.*
      - Umbel many-flowered; bulblets none . . . . . 7. *A. mutabile.*

Ovary and capsule conspicuously crested.
- Umbel nodding . . . . . 3. *A. cernuum.*
- Umbel erect; stamens and style exserted . . . . . 4. *A. stellatum.*
- Umbel erect; stamens and style included . . . . . 5. *A. reticulatum*

1. **A. tricóccum** Ait. (Wild Leek.) Scape (1.5–4 dm. high, from clustered pointed bulbs 3.5–5 cm. long) bearing an erect many-flowered umbel; *leaves* 10–23 cm. long and 3–6 *cm. wide;* segments of the perianth oblong (greenish white), equaling the nearly distinct filaments; *capsule strongly 3-lobed.* — Rich woods, N. B. to Minn. and Ia., s. in the mts. to N. C. — Leaves appearing in early spring and dying before the flowers are developed.

2. **A. Schoenóprasum** L., var. **sibíricum** (L.) Hartm. Scape (2–4 dm. high) bearing a globular *capitate umbel* of many rose-purple flowers; segments of the perianth lanceolate, pointed, longer than the simple downwardly dilated filaments; *leaves awl-shaped, hollow; capsule not crested.* — Ledgy shores, Nfd. to Alaska, s. to N. S., n. N. E., the Great Lake region, etc. (Eurasia.) — The typical form of the species (the *Chives* of vegetable gardens) is a lower and more slender but not sharply separable plant.

3. **A. cérnuum** Roth. (Wild Onion.) *Scape angular* (2.5–6 dm. high), nodding at the apex, bearing a *loose or drooping few-many-flowered umbel; leaves linear, flattened, sharply keeled* (3 dm. long); segments of the perianth oblong-ovate, acute, rose-color to purple, shorter than the slender filaments and style; *capsule 6-crested.* (? *A. allegheniense* Small.) — N. Y. to S. C., and westw.

4. **A. stellàtum** Ker. *Scape terete* (3–5 dm. high), slender, bearing an *erect umbel;* bulb-coats membranous; *capsule prominently 6-crested.* — Rocky slopes, Minn. to w. Ill., Mo., and westw.

5. **A. reticulàtum** Don. Scape 1–1.8 dm. high; *bulbs densely and coarsely fibrous-coated;* spathe 2-valved; umbel rarely bulbiferous; sepals ovate to narrowly lanceolate, *thin and lax* in fruit, *a third longer than the stamens; capsule crested.* — Sask. to Ia. and N. Mex.

6. **A. canadénse** L. (Wild Garlic.) Scape 3 dm. high or more; bulb small (1.2–1.8 cm. in diameter); bulb-coats somewhat fibrous; *umbel densely bulbiferous, the flowers few or often none;* segments of the perianth narrowly lanceolate, equaling or exceeding the stamens; *capsule not crested.* — Moist meadows, N. B. to Ont., s. to Fla. and Tex. May, June.

7. **A. mutábile** Michx. Similar in stature, habit, and flowers to preceding; *umbels not* normally *bulbiferous,* many (16–43)-flowered; bulbs 2–3 cm. in diameter. — Prairies and borders of woods, Mo. (*Bush.*) to Fla., Tex., and Neb.

8. **A. vineàle** L. (Field Garlic.) Stem slender (3–9 dm. high), clothed with the sheathing bases of the leaves below the middle; *leaves terete and hollow,* slender, channeled above; *umbel often densely bulbiferous; filaments much dilated, the alternate ones cuspidate* on each side of the anther. — Moist meadows and fields, locally abundant, Mass. to Mo., and Va. June. (Nat. from Eu.)

14. NOTHOSCÓRDUM Kunth.

Flowers greenish or yellowish white. Capsule obovoid, somewhat lobed, obtuse, with the style obscurely jointed on the summit; cells several-ovuled and -seeded. Filaments filiform, distinct, adnate at base. — Bulb tunicated, not alliaceous. Otherwise as in *Allium.* (Name from *νόθος, false,* and *σκόρδιον, garlic.*)

1. **N. bivàlve** (L.) Britton. Scape 1.5–3.5 dm. high; bulb small, often bulbiferous at base; leaves narrowly linear; flowers few, on slender pedicels, the segments narrowly oblong, about 1 cm. long; ovules 4–7 in each cell. (*N. striatum* Kunth.) — Prairies and open woods, Va. to O., Neb., and southw.

15. HEMEROCÁLLIS L. Day Lily

Perianth funnel-form, lily-like; the short tube inclosing the ovary, the spreading limb 6-parted; the 6 stamens inserted on its throat. Anthers as in *Lilium,* but introrse. Filaments and style long and thread-like, declined and ascending; stigma simple. Capsule (at first rather fleshy) 3-angled, loculicidally 3-valved, with several black spherical seeds in each cell. — Showy

perennials, with fleshy-fibrous roots; the long and linear keeled leaves 2-ranked at the base of the tall scapes, which bear at the summit several bracted and large flowers; these collapse and decay after expanding for a single day (whence the name, from ἡμέρα, *a day*, and κάλλος, *beauty*.)

1. H. FÚLVA L. (COMMON D.) Inner divisions (petals) of the tawny orange perianth wavy and obtuse. — Roadsides, escaped from gardens. (Introd. from Eu.)

16. LÍLIUM [Tourn.] L. LILY

Perianth funnel-form or bell-shaped, colored, of 6 divisions, spreading or recurved above, deciduous. Anthers linear, extrorsely attached near the middle to the tapering apex of the long filament, which is at first included, at length versatile; the cells dehiscent by a lateral or slightly introrse line. Style elongated; stigma 3-lobed. Capsule subcylindric; seeds densely packed in 2 rows in each cell. Bulbs scaly, producing simple stems, with numerous alternate-scattered or whorled narrow sessile leaves, and from one to several large and showy flowers in summer. (The classical Latin name, from the Greek λείριον.)

* *Flowers erect; sepals narrowed below into claws; bulbs not rhizomatous.*

1. L. philadélphicum L. (WILD ORANGE-RED L., WOOD L.) Stem 4–9 dm. high; *leaves linear-lanceolate*, chiefly whorled; *flowers* 1–3, open-bell-shaped, *reddish-orange*, spotted with purplish inside; the lanceolate segments little or not at all recurved at the obtusish or shortly acuminate summit; pod somewhat rounded at base. — Dry or sandy ground, N. E. to Ont. and N. C. — Separated by no constant character from

Var. andìnum (Nutt.) Ker. Leaves, all but the uppermost, scattered; perianth divisions mostly deep red; pod attenuate at the base. (*L. umbellatum* Pursh; *L. lanceolatum* Fitzpatrick.) — Rich soil of prairies, and in bogs, Ont. and O. to Ark., and northwestw.

2. L. Catesbaèi Walt. (SOUTHERN RED L.) *Leaves linear-lanceolate, scattered;* flower solitary, open-bell-shaped, the large and long-clawed divisions of the perianth wavy on the margin and recurved at the caudate-attenuate summit, *scarlet*, spotted with dark purple and yellow inside; bulb-scales thin, narrow and leaf-bearing. — Pine-barrens, N. C. to Fla., w. to "Ky.," "s. Ill.," and "Mo."

* * *Flowers nodding; sepals sessile; bulbs rhizomatous.*

3. L. supérbum L. (TURK'S-CAP L.) Stem 9–23 dm. high; *lower leaves whorled*, lanceolate, attenuate at both ends, 3-nerved, smooth; flowers (3–40) in a pyramidal raceme; *perianth-divisions* (7–8 cm. long) *strongly revolute*, orange, with numerous dark purple spots inside. — Rich low grounds, N. B. to Va., w. to Minn. and Mo.

4. L. caroliniànum Michx. Nearly related to the preceding and with very similar flowers; stem 4–7 dm. high, 1–3 flowered; *leaves obovate to oblanceolate, obtusish or short-acuminate.* — Borders of mountain woods, Va. (*Small*), and southw.

5. L. canadénse L. (WILD YELLOW L.) Stem 6–20 dm. high; *leaves remotely whorled*, lanceolate, strongly 3-nerved, the margins and nerves rough; flowers long-peduncled, narrowly bell-shaped, the *perianth-divisions* (5–8 cm. long) *recurved-spreading above*, yellow or orange, usually spotted with brown. — Moist meadows and bogs, e. Que. to Ga., w. to Mo., Minn., and Ont.

6. L. Gràyi Wats. Stems 6–9 dm. high; leaves in whorls of 4–8, lanceolate, acute or slightly acuminate, smooth; *flowers* 1 or 2, *nearly horizontal*, the *perianth-divisions* (3.5–6 cm. long) but *little spreading above the rather broad base*, rather abruptly acute, deep reddish-orange, thickly spotted within. — Peaks of Otter, Va., and southw. in the mts. to N. C.

7. L. TIGRÌNUM Ker. (TIGER L.) Tall, pubescent above; *leaves scattered, narrowly lanceolate*, dark green, 5–7-nerved, *the upper axils bulbiferous;* flowers large, resembling those of *L. superbum.* — An escape from gardens. (Introd. from E. Asia.)

17. ERYTHRÒNIUM L. Dog's-tooth Violet

Perianth lily-like, of 6 lanceolate recurved or spreading divisions, deciduous, the 3 inner usually with a callous tooth on each side of the base, and a groove in the middle. Filaments 6, awl-shaped; anthers oblong-linear. Style elongated. Capsule obovoid, contracted at base, 3-valved, loculicidal. Seeds rather numerous. — Nearly stemless herbs, with two smooth and shining flat leaves tapering into petioles and sheathing the base of the commonly one-flowered scape, rising from a deep solid scaly bulb. Flowers rather large, nodding, in spring. (The Greek name for the purple-flowered European species, from *ἐρυθρός, red.*)

1. **E. americànum** Ker. (Yellow Adder's-tongue). Scape 1.5–2 dm. high; leaves elliptical-lanceolate, pale green, mottled with purplish and whitish and often minutely dotted; *perianth light yellow*, often spotted near the base (2–4 cm. long); style club-shaped; *stigmas united.* — Rich ground, N. B. to Fla., w. to Ont. and Ark.

2. **E. álbidum** Nutt. (White Dog's-tooth Violet.) Producing subterranean offshoots from the base of the corm; leaves elliptical-lanceolate, less or not at all spotted; *perianth pinkish-white;* inner divisions toothless; style more slender except at the apex, bearing 3 short *spreading stigmas.* — Rich ground, Ont. to N. J., w. to Minn. and Tex.

3. **E. mesochòreum** Knerr. *No basal offshoots;* leaves narrowly lance-oblong or linear-lanceolate, not mottled; *perianth-divisions bluish or lavender-tinted*, scarcely or not at all revolute; *stigmas spreading.* — Prairies, w. Ia. (*Burgess*) and Mo. to Kan. and Neb.

4. **E. propúllans** Gray. *Offshoot arising from the stem, near the middle;* leaves smaller and more acuminate; *flowers bright rose-color*, yellowish at base (12 mm. long); *style slender; stigmas united.* — In rich soil, Minn. and Ont.

Tùlipa sylvéstris L., a wild tulip of Europe, readily recognized by its solitary subscapose large yellow flowers, 6-divided perianth and thickish subsessile stigma, is said to be established in e. Pa. (*Fretz*). (Adv. from Eu.)

18. CAMÁSSIA Lindl.

Perianth slightly irregular, of 6 blue or purple spreading 3–7-nerved divisions; filaments filiform. Style thread-like, the base persistent. Capsule short and thick, 3-angled, loculicidal, 3-valved, with several black roundish seeds in each cell. — Scape and linear leaves from a coated bulb; the flowers in a simple raceme, mostly bracted, on jointed pedicels. (From the native Indian name *quamash* or *camass.*)

1. **C. esculénta** (Ker) Robinson. (Eastern Camass, Wild Hyacinth.) Scape 1.5–7 dm. high; leaves keeled; raceme elongated; bracts longer than the pedicels; divisions of the perianth pale blue, 3-nerved, 10–14 mm. long; capsule acutely triangular-globose. (*Scilla* Ker; *C. Fraseri* Torr.; *Quamasia esculenta* Coville; *Q. hyacinthina* Britton.) — Rich ground, w. Pa. to Minn., Tex., and Ga. — This species should be carefully distinguished from the larger flowered plant of the Northwest, which has long passed as *C. esculenta* Lindl., — a name which must be replaced by *Camassia quamash* Greene.

19. ORNITHÓGALUM [Tourn.] L. Star of Bethlehem

Perianth of 6 (white) spreading 3–7-nerved divisions. Filaments 6, flattened-awl-shaped. Style 3-sided; stigma 3-angled. Capsule roundish-angular, with few dark and roundish seeds in each cell, loculicidal. — Scape and linear channeled leaves from a coated bulb. Flowers corymbed, bracted; pedicels not jointed. (A whimsical name from *ὄρνις, a bird*, and *γάλα, milk.*)

1. **O.** umbellàtum L. Scape 1–2.5 dm. high; flowers 5–8, on *long and spreading pedicels;* perianth-divisions green in the middle on the outside. — Escaped from gardens. (Introd. from Eu.)

2. **O. NÙTANS** L. Scape 3 dm. high or more; flowers 5–6, large (2–2.5 cm. long), nodding on *very short pedicels;* filaments very broad. — Rarely escaped from gardens; Pa. to D. C. (Introd. from Eu.)

20. MUSCÀRI [Tourn.] Mill. Grape Hyacinth

Perianth globular or ovoid, minutely 6-toothed (blue, rarely pink or white). Stamens 6, included; anthers short, introrse. Style short. Capsule loculicidal, with 2 black angular seeds in each cell. — Leaves and scape (in early spring) from a coated bulb; the small flowers in a dense raceme, sometimes musk-scented (whence the name).

1. **M. BOTRYOÌDES** (L.) Mill. Leaves linear, 6–10 mm. broad; *flowers globular* (3–5 mm. long), deep blue, appearing like minute grapes. — Escaped from gardens into copses and fence-rows. (Introd. from Eu.)

2. **M. RACEMÒSUM** (L.) Mill. Leaves 2–3 mm. broad; *flowers oblong-urceolate* (4–5 mm. long), deep blue, fragrant. — Rare escape, s. N. Y. to Va. (Introd. from Eu.)

21. YÚCCA [Rupp.] L. Bear Grass. Spanish Bayonet

Perianth of 6 large white or greenish oval or oblong and acute flat withering-persistent segments, the 3 inner broader, longer than the 6 stamens. Stigmas 3, sessile. Capsule oblong, somewhat 6-sided, 3-celled, or imperfectly 6-celled by a partition from the back, fleshy, at length loculicidally 3-valved from the apex. Seeds very many in each cell, flattened. — Stems woody, in ours very short, bearing persistent rigid linear or sword-shaped leaves, and an ample panicle or raceme of showy flowers. (The native Haytian name for the root of the Cassava-plant.)

1. **Y. glaúca** Nutt. *Leaves very stiff and pungent*, 2–6 dm. long, 4–12 mm. wide, filiferous on the margin; *raceme mostly simple, nearly sessile* (3–12 dm. long); flowers 3.5–6 cm. wide; stigmas green, shorter than the ovary; capsule 6-sided (7 cm. long); *seeds* 10–12 *mm. broad.* (*Y. angustifolia* Pursh.) — Dak. to Ia., Mo., N. Mex., and Wyo. May, June.

2. **Y. filamentòsa** L. (Adam's Needle.) Caudex 3 dm. high or less, from a running rootstock; leaves numerous, coriaceous, more or less tapering to a short point, rough on the back, 4–6 dm. long, 2–4 cm. wide, filiferous on the margin; *panicle pyramidal, densely flowered, on a stout bracteate scape,* 1–3 *m. high;* flowers large; stigmas pale, elongated; capsule 3.5 cm. long; *seeds* 6 *mm. broad.* — Near the coast, Md. (where of the formal var. latifòlia Engelm. with leaves 5–9 cm. wide) to Fla. and La. July. — Very variable. Occasionally spontaneous about old gardens.

22. ASPÁRAGUS [Tourn.] L. Asparagus

Perennials, with much branched stems from thick and matted rootstocks, and small greenish-yellow axillary flowers on jointed pedicels. The narrow, commonly thread-like, so-called leaves are really branchlets, acting as leaves, clustered in the axils of little scales which are the true leaves. (The ancient Greek name.)

1. **A. officinàlis** L. (Garden A.) — A frequent escape. June. (Introd. from Eu.)

23. CLINTÒNIA Raf.

Perianth of 6 divisions, lily-like, deciduous. Filaments long and thread-like; anthers extrorsely fixed by a point above the base. Ovary ovoid-subcylindric, 2–3-celled; style long. — Short-stemmed perennials, with slender creeping rootstocks, bearing a naked peduncle sheathed at the base by the stalks of 2–4 large oblong or oval ciliate leaves; flowers umbeled, rarely single. (Dedicated to *De Witt Clinton*, prominent statesman, several times governor of New York.)

1. **C. boreàlis** (Ait.) Raf. Scape and leaves 14–25 cm. long; terminal *umbel 3–6-flowered* (sessile lateral umbels often present on the same scape); perianth greenish-yellow, somewhat downy outside (12–18 mm. long); berry ovoid, blue; *ovules* 20 *or more.* — Cold moist woods, Lab. to N. C., w. to Man. and Minn.

2. **C. umbellulàta** (Michx.) Morong. Flowers half as large as in the last, white, speckled with green or purplish dots; *umbel many-flowered;* berry globular, black; *ovules* 2 *in each cell.* (*C. umbellata* Torr.) — Rich woods, N. Y., N. J., and in the Alleghenies to Ga.

24. SMILACÌNA Desf. False Solomon's Seal

Perianth 6-parted, spreading, withering-persistent. Filaments 6, slender; anthers short, introrse. Ovary 3-celled, with 2 ovules in each cell; style short and thick; stigma obscurely 3-lobed. Berry globular, 1–2-seeded, at first greenish or yellowish-white speckled with madder brown, at length a dull subtranslucent ruby red. — Perennial herbs, with simple stems from creeping or thickish rootstocks, alternate nerved mostly sessile leaves, and white, sometimes fragrant flowers. (Name a diminutive of *Smilax.*)

* *Flowers on very short pedicels in a terminal racemose panicle; stamens exceeding the small* (2 *mm. long*) *segments; ovules collateral; rootstock stout, fleshy.*

1. **S. racemòsa** (L.) Desf. (False Spikenard.) Minutely downy (4–10 dm. high); leaves numerous, oblong or oval-lanceolate, taper-pointed, ciliate, abruptly somewhat petioled. (*Vagnera* Morong.) — Moist copses and banks.

** *Flowers larger* (4–5 *mm. long*), *on solitary pedicels in a simple few-flowered raceme; stamens included; ovules not collateral; rootstock rather slender.*

2. **S. stellàta** (L.) Desf. Plant (2–5 dm. high) nearly glabrous, or the 7–12 *oblong-lanceolate leaves* minutely downy beneath when young, slightly clasping; raceme sessile or nearly so. (*Vagnera* Morong.) — Moist banks, frequent. (Eu.)

3. **S. trifòlia** (L.) Desf. Glabrous, *dwarf* (1.3–2 dm. high); *leaves* 3 (sometimes 2 or 4), oblong, tapering to a *sheathing base;* raceme peduncled. (*Vagnera* Morong.) — Cold bogs, Lab. to N. J., westw. to B. C. (Siber.)

25. MAIÁNTHEMUM [Weber in] Wiggers.

Perianth 4-parted, and stamens 4. Ovary 2-celled; stigma 2-lobed. Otherwise as in *Smilacina.* — Flowers solitary or fascicled, in a simple raceme upon a low 2–3-leaved stem. Leaves ovate- to lanceolate-cordate. (Name from *Maius*, May, and *ἄνθεμον*, *a flower.*)

1. **M. canadénse** Desf. Pubescent or glabrous (6–22 cm. high); leaves lanceolate or ovate, cordate at base with a very narrow sinus, sessile or very shortly petioled; perianth-segments 2 mm. long. (*Unifolium* Greene.) — Moist woods, Lab. to N. C., w. to Ia., Dak., and Man.

26. DÍSPORUM Salisb.

Perianth narrowly bell-shaped, the 6 lanceolate or linear divisions deciduous. Filaments thread-like, much longer than the linear-oblong blunt anthers. Ovary with 2 ovules (in our species) suspended from the summit of each cell; style one; stigmas 3, short, recurved-spreading, or sometimes united into one! Berry ovoid or subcylindric, pointed, 3–6-seeded, red. — Downy low herbs, with creeping rootstocks, erect stems sparingly branched above, closely sessile ovate thin leaves, and greenish-yellow drooping flowers on slender terminal peduncles, solitary or few in an umbel. (Name from *δίς*, *double*, and *σπορά*, *seed*, in allusion to the 2 ovules in each cell.)

1. **D. lanuginòsum** (Michx.) Nichols. Leaves taper-pointed, rounded or

slightly heart-shaped at base; flowers solitary or in pairs; perianth (18 mm. long) soon spreading, twice the length of the stamens, greenish; stigmas 3.— Rich woods, Ont. and w. N. Y. to O., Tenn., and Ga.

27. STRÉPTOPUS Michx. Twisted-stalk

Perianth recurved-spreading from a bell-shaped base, deciduous; the 6 divisions lanceolate, acute, the 3 inner keeled. Anthers arrow-shaped, extrorse, fixed near the base to the short flattened filaments, tapering above to a slender entire or 2-cleft point. Berry red, roundish-ovoid, many-seeded.— Herbs, with rather stout stems from a short or creeping rootstock, ordinarily forking and divergent branches, ovate and taper-pointed rounded-clasping membranaceous leaves, and small (extra-) axillary flowers, either solitary or in pairs, on slender thread-like peduncles, which are abruptly bent or contorted near the middle (whence the name, from στρεπτός, *twisted*, and πούς, *foot* or *stalk*).

1. **S. amplexifòlius** (L.) DC. Stem 3–9 dm. high, glabrous; *leaves very smooth, glaucous underneath*, strongly clasping; *flower greenish-white* (about 1 cm. long); *perianth-segments wide-spreading or recurved from near the middle; anthers many times exceeding the filaments*, tapering to a slender *entire point; stigma entire, truncate;* fruit ellipsoid or globose, 1–2 cm. long, scarlet.— Cold moist woods, Greenl. to Alaska, s. to N. E., Pa., O., Minn., and in the mts. to N. C. and N. Mex. (Eurasia.)

2. **S. ròseus** Michx. Lower (2–6 dm. high); *rootstock short and thick; leaves green both sides, finely ciliate;* the branches sparingly beset with short bristly hairs; *flower rose-purple* (8–12 mm. long), more than half the length of the slightly bent peduncle, the *perianth-segments with only the tips recurved in age;* anthers ovate, 2-horned, about equaling the filaments; *stigma 3-cleft;* fruit subglobose, 1 cm. in diameter, cherry-red.— Cold damp woods, Nfd. to the mts. of Ga., w. to Wisc. and Man. May, June.

3. **S. lóngipes** Fernald. Similar; *rootstock slender and wide-creeping;* stem ciliate-hispid above, 3–4 dm. high; leaves ciliate, sessile, pale beneath; perianth campanulate, reddish; anthers and stigmas as in no. 2.— Woods, Marquette Co., Mich.

28. POLYGÓNATUM [Tourn.] Hill. Solomon's Seal

Perianth cylindrical, 6-lobed at the summit; the 6 stamens inserted on or above the middle of the tube, included; anthers introrse. Ovary 3-celled, with 2–6 ovules in each cell; style slender, deciduous by a joint; stigma obtuse or capitate, obscurely 3-lobed. Berry globular, black or blue; the cells 1–2-seeded. — Perennial herbs, with simple stems from creeping knotted rootstocks, naked below, above bearing nearly sessile or half-clasping nerved leaves, and axillary nodding greenish flowers; pedicels jointed near the flower. (Name from πολύ-, *many*, and γόνυ, *knee*, alluding to the numerous joints of the rootstock.)

1. **P. biflòrum** (Walt.) Ell. (Small S.) Glabrous, except the ovate-oblong or lance-oblong *nearly sessile leaves*, which are commonly *minutely pubescent as well as pale or glaucous underneath;* stem slender (3–9 dm. high); *peduncles 1–3- but mostly 2-flowered;* perianth 10–12 mm. long; *filaments papillose-roughened*, inserted toward the summit of the perianth. (? *P. boreale* Greene; *P. cuneatum* Greene; *Salomonia biflora* Farwell.)— Wooded hillsides, N. B. to Fla., w. to Ont., e. Kan., and Tex.

2. **P. commutàtum** (R. & S.) Dietr. (Great S.) *Glabrous throughout*, stem stout (0.6–2 m. high), terete; *leaves ovate, partly clasping* (12–18 cm. long), or the upper oblong and nearly sessile, many-nerved; *peduncles several (2–8)-flowered*, jointed below the flower; flowers 12–20 mm. long; *filaments smooth and naked*, or nearly so, inserted on the middle of the tube. (*P. giganteum* Dietr.; ? *P. virginicum* Greene; *Salomonia commutata* Farwell.)— Meadows and river-banks, w. N. H. and R. I. to Ga. and w. to the Rocky Mts June.

29. CONVALLÀRIA L. Lily of the Valley

Perianth bell-shaped, white, with 6 short recurved lobes. Stamens 6, included, inserted on the base of the perianth; anthers introrse. Ovary 3-celled, tapering into a stout style; stigma triangular. Ovules 4–6 in each cell. Berry few-seeded, red. — Perennial herb, glabrous, stemless, with slender running rootstocks, 2 or 3 oblong leaves, and an angled scape bearing a one-sided raceme of sweet-scented nodding flowers. (From *Lilium convallium*, the popular name.)

1. **C. majàlis** L. — High mountains, Va. to S. C. — Apparently identical with the European Lily of the Valley of the gardens which occurs as an occasional escape from cultivation elsewhere within our limits.

30. MEDÈOLA [Gronov.] L. Indian Cucumber-root

Perianth recurved; the 3 sepals and 3 petals oblong and alike, pale greenish-yellow, deciduous. Stamens 6; anthers shorter than the slender filaments, oblong. Styles stigmatic down the upper side, recurved-diverging from the globose ovary, long and thread-form, deciduous. Berry globose, dark purple, 3-celled, few-seeded. — A perennial herb, with a simple slender stem (3–9 dm. high, clothed with flocculent and deciduous wool), rising from a horizontal white tuber (with taste of cucumber), bearing near the middle a whorl of 5–9 obovate-lanceolate leaves; also another of 3 (rarely 4 or 5) much smaller ovate ones at the top, subtending a sessile umbel of small recurved flowers. (Named after the sorceress *Medea*, for its supposed great medicinal virtues.)

1. **M. virginiàna** L. — Rich damp woods, N. B. to Ont., Minn., and Fla. June.

31. TRÍLLIUM L. Wake Robin. Birthroot

Sepals 3, lanceolate, spreading, herbaceous, persistent. Petals 3, larger, withering in age. Stamens 6; anthers linear, on short filaments, adnate. Styles awl-shaped or slender, spreading or recurved above, persistent, stigmatic down the inner side. Seeds ovate, horizontal, several in each cell. — Low perennial herbs, with a stout and simple stem rising from a short and praemorse tuber-like rootstock, bearing at the summit a whorl of 3 ample, commonly broadly ovate, more or less ribbed but netted-veined leaves, and a terminal large flower; in spring. (Name from *tres*, three; all the parts being in threes.) — Monstrosities are not rare with the calyx and sometimes petals changed to leaves, or the parts of the flower increased in number.

* *Ovary and fruit 6-angled and more or less winged.*

← *Flower sessile; leaves usually mottled.*

1. **T. séssile** L. *Leaves sessile;* sepals spreading; *sessile petals erect-spreading*, narrowly lanceolate or oblanceolate, dark and dull purple, varying to greenish; fruit globose, 1.2 cm. long. — Moist woods, Pa. to Minn. and southw.

2. **T. víride** Beck. Larger (3–4 dm. high); *leaves sessile, ovate*, acuminate; sepals spreading; *petals linear*, 3–5 cm. long, *greenish.* — Rich woods and open hillsides, Kan., Mo., and southeastw.

3. **T. recurvàtum** Beck. *Leaves contracted at the base into a petiole, ovate, oblong, or obovate; sepals reflexed; petals* pointed, the base *narrowed into a claw*, oblong-lanceolate to -ovate, dark purple; fruit ovoid, strongly winged above, 1.8 cm. long. — Rich woods, O. to Minn., Ark., "Miss.," and Tenn.

← ← *Flower pediceled; connective narrow, not produced; leaves subsessile.*
↔ *Anthers at anthesis exceeding the stigmas.*

4. **T. eréctum** L. Leaves very broadly rhombic, shortly acuminate; peduncle (2–8 cm. long) usually more or less inclined or declinate; *petals ovate to lanceolate* (18–36 mm. long), brown-purple or often white or greenish or pinkish; stamens exceeding the *stout distinct spreading or recurved stigmas;* ovary purple; fruit ovoid, 2.5 cm. long, reddish. — Rich woods, e. Que. to Ont., southw. to Pa. and in the mts. to N. C. — Flowers ill-scented.

5. **T. grandiflòrum** (Michx.) Salisb. Leaves less broadly rhombic-ovate; pedicel erect or ascending; *petals oblanceolate*, often broadly so (4–6 cm. long), white turning rose-color or marked with green; stamens with stout filaments (persistently green about the fruit) and anthers, *exceeding the very slender erect or suberect and somewhat coherent stigmas;* fruit subglobose. — Rich woods, w. Que. and w. Vt. to Minn., Mo., and N. C.

** *Anthers at anthesis surpassed by the stigmas.*

6. **T. cérnuum** L. Leaves very broadly rhombic-ovate; *peduncles* (8–33 mm. long) usually *recurved;* petals white or pink, ovate- to oblong-lanceolate (12–24 mm. long), wavy, recurved-spreading; *filaments nearly or quite equaling the anthers;* ovary white or pinkish; stigmas stoutish, tapering from the base to the apex; fruit ovoid. — Moist woods, Nfd. to Man., southw. to Pa., Mich., Minn., and in the mts. to Ga.

7. **T. declinàtum** (Gray) Gleason. Leaves broadly rhombic; *peduncles* (4–6 cm. long) usually *horizontal;* petals white, ovate-oblong (2–3.5 cm. long); *filaments less than half as long as the anthers;* stigmas short, stout, tapering from the base to the apex; ovary white or pinkish. (*T. erectum*, var. Gray.) — Woods, O. and s. Mich. to s. Minn. and Mo.

** *Ovary and fruit 3-lobed or -angled, not winged; filaments slender, about equaling the anthers; pedicel erect or inclined; leaves petiolate.*

8. **T. nivàle** Riddell. (Dwarf White or Snow T.) Small (5–10 cm. high); *leaves oval or ovate, obtuse* (2.5–5 cm. long); *petals oblong, obtuse* (12–30 mm. long), *white*, scarcely wavy, spreading from an erect base, equaling the peduncle; styles long and slender; fruit depressed-globose, with 3 rounded lobes, 6–8 mm. long. — Rich woods, w. Pa. and Ky. to Minn. and Ia.

9. **T. undulàtum** Willd. (Painted T.) *Leaves ovate, taper-pointed; petals ovate or oval-lanceolate, pointed, wavy*, widely spreading, *white painted with purple stripes at the base*, shorter than the peduncle; fruit broad-ovoid, obtuse, 14–18 mm. long. (*T. erythrocarpum* Michx.) — Cold damp woods and bogs, e. Que. to Ont. and Wisc., southw. in the mts. to Ga.

32. ÁLETRIS L. Colic-root. Star Grass

Perianth cylindrical, wrinkled and roughened outside by thickly set points, the tube adhering below to the base of the ovary, 6-cleft at the summit. Stamens 6, inserted at the base of the lobes; filaments and anthers short, included. Style awl-shaped, 3-cleft at the apex; stigmas minutely 2-lobed. Capsule ovoid, beaked, inclosed in the roughened perianth; seeds numerous, minute, costate. — Perennial and smooth stemless herbs, very bitter, with fibrous roots, and a spreading cluster of thin and flat lanceolate leaves; the small flowers in a spike-like raceme, terminating a naked slender scape (4–10 dm. high). (Ἀλετρίς, a female slave who grinds corn; in allusion to the apparent mealiness of the blossoms.)

1. **A. farinòsa** L. Flowers tubular, white; lobes lanceolate-oblong. — Grassy or sandy woods, s. Me. to Fla., Ark., and Minn. July, Aug.

2. **A. aúrea** Walt. Flowers bell-shaped, yellow, fewer and shorter than in the preceding; lobes short-ovate. — Barrens, "Va.," S. C. to Fla. and Tex.

33. SMÌLAX [Tourn.] L. Green Brier. Cat Brier

Flowers dioecious in umbels on axillary peduncles, small, greenish or yellowish, regular, the perianth-segments distinct, deciduous. Filaments linear, inserted on the very base, the introrse anthers linear or oblong, fixed by the base, apparently 1-celled. Ovary of fertile flowers 3-celled (1-celled, with single stigma in *S. laurifolia*); stigmas thick and spreading, almost sessile; ovules 1 or 2 in each cell, pendulous, orthotropous. Fruit a small berry. — Shrubby or herbaceous, usually climbing or supported by a pair of tendrils on the petiole of the

ribbed and netted-veined simple leaves. (An ancient Greek name, of obscure meaning.)

§ 1. *Stems herbaceous, not prickly; flowers carrion-scented; ovules 2 in each cell; leaves membranous, mucronate-tipped; berries bluish-black with a bloom.*

1. **S. herbàcea** L. (Carrion-flower.) Stem climbing, 1–5 m. high; *leaves ovate or rounded, mostly heart-shaped* or truncate at base, abruptly acute to short-acuminate, 7–9-*nerved*, smooth; petioles 1–4 cm. long; peduncles 4–20 cm. long, often much exceeding the leaves, 20–40-flowered; seeds 2–6. — Moist meadows and river-banks, common, N. B. to Man. and Tex. June. — Variable. Var. pulverulénta (Michx.) Gray. Leaves sparingly to densely puberulent on the veins beneath. (*S. pulverulenta* Michx.) — Pa. to Ont., w. to Mont. and Kan.

2. **S. tamnifòlia** Michx. Stem upright or climbing; *leaves mostly* 5-*nerved*, smooth, broadly ovate to lanceolate, truncate or cordate at base, abruptly acute to acuminate, some of them *hastate with broad rounded lobes;* peduncles longer than the petioles; berry smaller, 2–3-seeded. — Pine-barrens, Pa. and N. J. to S. C.

3. **S. ecirrhàta** (Engelm.) Wats. Erect, 1.5–9 dm. high, *without tendrils* (or only the uppermost petioles tendril-bearing); lower leaves reduced to narrow scale-like bracts, the rest thin, 5–7-nerved, *broadly ovate-elliptical* to roundish, acute, mostly cordate at base, 4–12 cm. long, pubescent beneath; peduncles and petioles 3–7 cm. long; umbels 10–20-flowered; berry 3-seeded. — O. and Md. to S. C., Wisc., "Minn.," and Mo.

§ 2. *Stems woody, often prickly; ovules solitary; glabrous throughout.*

* *Leaves ovate or roundish, etc., most of them rounded or heart-shaped at base, and 5–9-nerved, the three middle nerves or ribs stronger and more conspicuous.*

← *Peduncles* (4–13 *mm. long*) *shorter or scarcely longer than the petioles, flattened; leaves thickish, green both sides.*

4. **S. Waltèri** Pursh. Stem low, somewhat angled, prickly near the base or unarmed; *leaves ovate to ovate-lanceolate or oblong, somewhat heart-shaped* or rounded at base (5–11 cm. long); *berries coral-red.* — Pine-barrens, N. J. to Fla.

5. **S. rotundifòlia** L. (Common Green Brier, Horse Brier.) Stem as well as the terete branches armed with scattered prickles; branchlets more or less 4-angular; *leaves ovate or round-ovate*, often broader than long, slightly heart-shaped, abruptly short-pointed, obscurely denticulate or entire; *berries blue-black*, with a bloom. — Moist thickets, N. S. to Ga., w. to Minn. and Tex. — Very variable, passing into var. quadrangulàris (Muhl.) Wood., which has branches, and especially branchlets, 4-angular, and is more common westw.

← ← *Peduncle longer than but seldom twice the length of the short petiole, flattened; leaves tardily deciduous or partly persistent; berries black, with a bloom.*

6. **S. glaúca** Walt. (Saw Brier.) Terete branches and somewhat 4-angular glaucous branchlets armed with scattered stout prickles, or naked; *leaves ovate*, rarely subcordate, *glaucous beneath* and sometimes also above (5–7 cm. long), abruptly mucronate, the edges smooth and naked. — Dry thickets, e. Mass. to Fla., w. to Tex.

7. **S. Bòna-nox** L. Branches and the angular (often square) branchlets sparsely armed with short rigid prickles; *leaves* varying from round-heart-shaped and slightly contracted above the dilated base to fiddle-shaped and halberd-shaped or 3-lobed, *green and shining both sides*, cuspidate-pointed, the margins often somewhat bristly-ciliate or spinulose. (*S. tamnoides* Man. ed. 5; probably not L.) — Thickets; Nantucket, Mass.; N. J. to Fla., w. to Ill., Mo., and Tex.

+ + + *Peduncle 2–4 times the length of the petiole; leaves ample (7–12 cm. long), thin or thinnish, green both sides; berries black; stem terete and branchlets nearly so.*

8. S. hìspida Muhl. Rootstock cylindrical, elongated; *stem* (climbing high) below densely *beset with long and weak blackish bristly prickles*, the flowering branchlets mostly naked; *leaves* ovate and the larger heart-shaped, pointed, slightly rough-margined, *membranaceous and deciduous;* peduncles 2–5 cm long; perianth-divisions lanceolate, almost 6 mm. long. — Moist thickets, Ct. to Va., w. to Ont., Minn., Kan., and Tex. June.

9. S. pseùdo-chìna L. *Rootstock tuberous; stems and branches unarmed*, or with very few weak prickles; leaves ovate-heart-shaped, or on the branchlets ovate-oblong, cuspidate-pointed, often rough-ciliate, becoming firm in texture; peduncles flat (5–7 cm. long). — Dry or sandy soil, N. J. to Fla., w. to s. Ind. and Kan. July.

* * *Leaves varying from oblong-lanceolate to linear, narrowed at base into a short petiole, 3–5-nerved, shining above, paler or glaucous beneath, many without tendrils; peduncles short, seldom exceeding the petioles, terete; the umbels sometimes panicled; branches terete, unarmed.*

10. S. lanceolàta L. *Leaves thinnish*, rather deciduous, ovate-lanceolate or lance-oblong; *stigmas* 3; *berries dull red.* — Rich woods and margins of swamps, Va. to Fla., w. to Ark. and Tex. June.

11. S. laurifòlia L. *Leaves thick and coriaceous, evergreen*, varying from oblong-lanceolate to linear (6–12 cm. long); *stigmas solitary* and *ovary 1-celled; berries black* when ripe, 1-seeded, maturing in the second year. — Pine-barrens, N. J. to Fla., w. to Ark., and Tex. July, Aug.

HAEMODORÀCEAE (Bloodwort Family)

Perennial stoloniferous herbs with fibrous roots, equitant leaves, and perfect 3–6-androus regular woolly flowers; the tube of the 6-lobed perianth coherent with the whole surface, or with merely the lower part, of the 3-celled ovary. — Anthers introrse. Capsule crowned or inclosed by the persistent perianth, 3-celled, loculicidal, 3–many-seeded. A small family; chiefly of the southern hemisphere. Ours with dense compound cymes of dingy yellow flowers.

1. **Lachnanthes.** Stamens 3. Ovary inferior.
2. **Lophiola.** Stamens 6. Ovary nearly free.

1. LACHNÁNTHES Ell. Red-root

Perianth 6-parted down to the adherent ovary. Stamens opposite the 3 larger or inner divisions; filaments long, exserted; anthers soon curved or coiled, attached near the base. Style thread-like, exserted, declined. Capsule globular. Seeds few on each fleshy placenta, flat and rounded, fixed by the middle. — Leaves clustered at the base and scattered on the stem, which is hairy at the top and terminated by a dense compound cyme of dingy yellow and loosely woolly flowers (whence the name, from λάχνη, *wool*, and ἄνθος, *blossom*).

1. L. tinctòria (Walt.) Ell. Erect, 3–10 dm. high. (*Gyrotheca* Salisb.) — Sandy swamps, near the coast, Cape Cod, Mass., R. I., and N. J. to Fla. July-Sept.

2. LOPHÌOLA Ker.

Divisions of the perianth nearly equal, spreading, longer than the 6 stamens, which are inserted at their base. Anthers fixed by the base. Capsule ovoid, free from the perianth except at the base, pointed with the awl-shaped style, which finally splits into 3 divisions, one terminating each valve. Seeds numerous, oblong, ribbed, anatropous. — Slender herb with linear and nearly smooth

leaves; inflorescence and upper part of the stem whitened with soft matted wool. Perianth-lobes naked only toward the tip, each clothed with a woolly tuft near the base (whence the name, from λοφιά, *a crest*).

1. **L. aúrea** Ker. Perianth-segments dull yellow within. (*L. americana* Coville.) — Boggy pine-barrens, N. J. to Fla. June–Aug.

DIOSCOREÀCEAE (Yam Family)

Plants with twining stems from large tuberous roots or knotted rootstocks, and ribbed and netted-veined petioled leaves, small dioecious 6-androus and regular flowers, with the 6-cleft calyx-like perianth adherent in the fertile plant to the 3-celled ovary. Styles 3, distinct. — Ovules 1 or 2 in each cell, anatropous. Fruit usually a membranaceous 3-angled or -winged capsule.

1. DIOSCORÈA [Plumier] L. Yam

Flowers very small, in axillary panicles or racemes. Capsule loculicidally 3-valved by splitting through the winged angles. Seeds flat, with a membranaceous wing. (Dedicated to the Greek naturalist, *Dioscorides.*)

1. **D. villòsa** L. (Wild Yam-root.) Herbaceous; stems slender, from knotty and matted rootstocks, twining over bushes; leaves mostly alternate, sometimes nearly opposite or in fours, more or less downy beneath, heart-shaped, conspicuously pointed, 9–11-ribbed; flowers pale greenish-yellow, the sterile in drooping panicles, the fertile in drooping simple racemes; capsules 1.6–2.5 mm. long. — Thickets, s. N. E. to Fla., w. to Ont., Minn., Kan., and Tex. — According to *C. G. Lloyd* the typical villous-leaved form has a matted rootstock the divisions of which are scarcely thicker than the stems. He distinguishes, as var. glàbra Lloyd, a form with a thick knotted rootstock and glabrous leaves. This form or possibly state, occurring in Ky. and probably elsewhere, is said to be inferior for pharmaceutical use. The relation between the smooth foliage and thickened rootstock does not, however, appear to be definite.

AMARYLLIDÀCEAE (Amaryllis Family)

Chiefly bulbous and scape-bearing herbs, not scurfy or woolly, with linear flat root-leaves, and regular (or nearly so) and perfect 6-androus flowers, the tube of the corolline 6-parted perianth coherent with the 3-celled ovary; the lobes imbricated in the bud. — Anthers introrse. Style single. Capsule 3-celled, several–many-seeded. Seeds anatropous or nearly so, with a straight embryo in the axis of fleshy albumen.

* Fruit a 3-valved loculicidal capsule; plant glabrous.

+ Perianth with a conspicuous crown in the throat.

1. **Hymenocallis.** Perianth-tube slender, the lobes narrow, recurved; a cup-shaped crown connecting the filaments.
2. **Narcissus.** Perianth-tube produced at the base of the spreading ovate lobes into a true crown. Filaments without a connecting cup.

+ + Perianth naked in the throat.

++ Low bulbous plants with 1-flowered scapes.

3. **Zephyranthes.** Anthers versatile on filiform somewhat elongated filaments; tube of the perianth shorter than the throat and limb.
4. **Cooperia.** Anthers dorsifixed near the base; filaments short; tube of the perianth much exceeding the throat and limb.

++ ++ Tall, not bulbous; flowers spicate.

5. **Agave.** Perianth equally 6-cleft, without crown; leaves fleshy.

* * Fruit indehiscent; anthers sagittate; plant villous.

6. **Hypoxis.** Perianth 6-parted nearly down to the ovary, persistent; bulb solid.

1. HYMENOCÀLLIS Salisb.

Capsule thin, 2–3-lobed; seeds usually 2 in each cell, basal, fleshy, often like bulblets. — Scapes and leaves from a coated bulb. Flowers white, fragrant, large and showy, sessile in an umbel-like head or cluster, subtended by 2 or more scarious bracts. (Name composed of ὑμήν, *a membrane*, and κάλλος, *beauty*.)

1. **H. occidentàlis** (Le Conte) Kunth. Leaves strap-shaped, glaucous, 3–5 dm. long, 18–36 mm. broad; scape 3–6-flowered; bracts narrow, 5 cm. long; perianth-tube about 8–10 cm. long, the linear segments scarcely shorter; the crown 2.5–3 cm. long, tubular below, broadly funnel-form above, the margin deltoid and entire, or 2-toothed and erose, between the white filaments, which are twice longer; anthers yellow; style green. — Marshy banks of streams, s. Mo. and s. Ill. to n. Ga., and Ala.

2. NARCÍSSUS [Tourn.] L.

Capsule thin, 3-celled; seeds numerous in each cell, affixed in 2 series to the axile placenta. Flowers (in our species) solitary on leafless scapes subtended by a deciduous or marcescent spathe. (Name of the youth who, according to a Greek myth, was changed into this flower.)

1. **N. Pseùdo-Narcíssus** L. (Daffodil.) Crown at least as long as the perianth-segments, yellow. — Established in meadows, Pa. and N. J. (Introd. from Eu.)

2. **N. poéticus** L. (Poet's Narcissus.) Crown less than half as long as the perianth-segments, white edged with pink. — Established in meadows, N. E., L. I., and Pa. (Introd. from Eu.)

3. ZEPHYRÁNTHES Herb

Perianth funnel-form, from a tubular base; the 6 divisions petal-like and similar, spreading above; the 6 stamens inserted in its naked throat. Pod membranaceous, 3-lobed. (From ζέφυρος, *a wind*, and ἄνθος, *flower*.)

1. **Z. Atamásco** (L.) Herb. (Atamasco Lily.) Leaves bright green and shining, very narrow, channeled, the margins acute; scape 2–3.5 dm. high; peduncle short; spathe 2-cleft at the apex; perianth white and pink, 6–9 cm. long; stamens and style declined. (*Atamosco* Greene.) — Pa. to Fla. June.

4. COOPÈRIA Herb.

Perianth-tube very long and slender, the limb widely spreading, 6-parted, the short stamens borne on the throat. Spathe single, membranaceous. Capsule depressed-globose; seeds numerous. — Leaves grass-like from a tunicate bulb. (Named in honor of *Daniel Cooper*, an English botanist of the early part of the 19th century.)

1. **C. Drummóndii** Herb. Scape slender, 2–5 dm. high; perianth white or rose-tinged, the stalk-like tube often 1 dm. in length. — Prairies, s. Kan. and southwestw.

5. AGÀVE L. American Aloe

Perianth tubular-funnel-form, persistent, 6-parted; the divisions nearly equal, narrow. Stamens 6; anthers linear, versatile. Capsule coriaceous, many-seeded; seeds flattened. — Leaves thick and fleshy, often with cartilaginous or spiny teeth, clustered at the base of the many-flowered scape, from a thick fibrous-rooted crown. (Name from ἀγανή, *noble*, — not inappropriate as applied to A. americàna, the Century Plant.)

1. **A. virgínica** L. (False Aloe.) Herbaceous; leaves entire or denticulate; scape 1–2 m. high; flowers scattered in a loose wand-like spike, greenish-yellow, fragrant; perianth 18–24 mm. long, its narrow tube twice longer than the erect lobes. — Dry or rocky banks, Md. and Va. to Fla., w. to s. O., s. Ind., Mo., and Tex.

6. HYPÓXIS L. Star Grass

Perianth spreading. Fruit crowned with the withered or closed perianth. Seed globular. — Stemless small herbs, with grassy and hairy linear leaves and slender few-flowered scapes. (An old name for a plant having sourish leaves, from ὕποξυς, *sub-acid.*)

1. **H. hirsûta** (L.) Coville. Leaves linear, grass-like, longer than the umbellately 1–4-flowered scape; divisions of the perianth hairy and greenish outside, yellow (rarely whitish) within. (*H. erecta* L.) — Meadows and open woods, s. w. Me. to Fla., Assina., e. Kan. and Tex.

IRIDÀCEAE (Iris Family)

Herbs, with equitant 2-ranked leaves, and regular or irregular perfect flowers; the 3 petals and 3 petal-like sepals convolute in the bud, the tube adnate to the 3-celled ovary, and 3 distinct or monadelphous stamens, alternate with the petals, with extrorse anthers. — Flowers from a spathe of 2 or more leaves or bracts, usually showy. Style single, usually 3-cleft; stigmas 3, opposite the cells of the ovary, or 6 by the parting of the style-branches. Capsule 3-celled, loculicidal, many-seeded. Seeds anatropous; embryo straight in fleshy albumen. Rootstocks, tubers, or corms mostly acrid

* Branches of the style (or stigmas) opposite the anthers.

1. **Iris.** Sepals spreading or recurved. Petals spreading or erect. Stigmas petal-like.

** Branches of the style alternate with the anthers; flower regular.

2. **Nemastylis.** Stem from a coated bulb. Filaments united. Style-branches 2-cleft.
3. **Belamcanda.** Stems from a creeping rhizome. Filaments distinct. Stigmas dilated.
4. **Sisyrinchium.** Root fibrous. Filaments united. Stigmas thread-like.

1. ÌRIS [Tourn.] L. Fleur-de-lis

Tube of the flower more or less prolonged beyond the ovary. Stamens distinct; the oblong or linear anthers sheltered under the over-arching petal-like stigmas (or rather branches of the style, bearing the true stigma in the form of a thin lip or plate under the apex); most of the style connate with the sepals and petals into a tube. Capsule 3–6-angled, coriaceous. Seeds depressed-flattened, usually in 2 rows in each cell. — Perennials, with sword-shaped or grassy leaves, and large showy flowers; ours with creeping and more or less tuberous rootstocks. (Ἶρις, *the rainbow.*)

* *Stems leafy and rather tall, from usually thickened rootstocks, often branching; tube much shorter than the sepals, which are usually much larger than the petals.*

– *Sepals neither bearded nor crested.*

–– *Spathes all terminal or at the tips of elongate peduncles.*

= *Flowers violet-blue, variegated with green, yellow, or white, and purple-veined.*

a. Ovary and capsule obtusely angled.

1. Seeds in 2 rows in each cell.

1. **I. versícolor** L. (Larger Blue Flag.) Stem stout, angled on one side, 1.5–9 dm. high; *leaves sword-shaped* (0.5–2.5 cm. wide), *glaucous;* ovary obtusely triangular, with flat sides; flowers (5–8 cm. long) short-pediceled, variegated with green, yellow and white toward the center, the funnel-form tube shorter than the ovary; *petals flat, oblanceolate* or narrowly obovate, *half as long as the sepals; style-branches with* slightly *overlapping* petaloid *lobes; capsule firm,* subcylindric, turgid, with rounded angles, *stout-beaked; seeds* 4–6 *mm.*

broad, flattened on the sides, the rhaphe not apparent. — Wet places, Nfd. to Man. and southw. May–July.

2. I. setòsa Pall., var. canadénsis Foster. Stems slender, terete, 1.5–5 dm high, mostly flecked at base with purplish; *leaves bright green, strongly nerved* 0.5–1 cm. broad; flowers short-pediceled, strongly marked with white toward the center; the inconspicuous *involute or tubular pointed petals* ¼ *as long as the sepals; style-branches with spreading lobes; capsule* subcylindric or ovoid, *blunt or barely mucronate*, the *thin elastic walls* pale, flecked with purple, the angles obtuse or rounded; *seeds 2–3.5 mm. broad, with plump sides and prominent rhaphe.* (*I. Hookeri* Penny.) — Seabeaches and headlands, Lab. and Nfd. to the lower St. Lawrence; and along the coast to e. Me. June, July.

2. *Seeds in* 1 *row in each cell.*

3. I. caroliniàna Wats. Tall (1 m. or less high); leaves bright green, soft, 1–3 cm. broad; flowers subsessile or short-pediceled, "lilac, variegated with yellow, purple and brown;" petals more than half the length of the sepals; seeds, with flattened sides, 8–10 mm. broad. — Swamps, s. Va. to Ga. and La. June.

a a. Ovary and capsule sharply angled.

4. I. prismática Pursh. (Slender Blue Flag.) Stem *very slender*, terete, 2.5–9 dm. high, from a slender rootstock; *leaves narrowly linear* (3–7 mm. wide); flowers slender-pediceled (4–6 cm. long), the tube extremely short; ovary 3-angled. — Marshes near the coast, N. S. to Ga. June, July.

= = *Flowers brown or yellow.*

5. I. fúlva Ker. Stem and leaves as in no. 1; *flowers copper-colored or dull reddish-brown*, variegated with blue and green; *petals widely spreading;* tube cylindrical, as long as the 6-angled ovary; style-branches narrow. — Swamps, s. Ill. and Mo. to La. and Ga. May.

I. pseudácorus L., the Yellow Iris of European marshes, with several very long linear leaves, *bright yellow* beardless flowers, and *erect petals*, is becoming established in N. E., N. Y., and N. J.

I. orientàlis Mill. (*I. ochroleuca* L.), an Asiatic species, with stem-leaves few and reduced, and pale-yellow or whitish flowers, is freely cultivated, and tends to become naturalized in marshes on the coast of Ct. (*Mrs. M. E. Russell*).

↔ ↔ *Spathes mostly subsessile or on inconspicuous peduncles in the axils of the upper conspicuous leaves; flowers large, blue-violet.*

6. I. hexágona Walt. Stem terete, flexuous, 3–9 dm. tall; leaves green, not glaucous, the upper very elongated and much overtopping the flowers, 1–3 cm. broad; flowers mostly axillary, resembling those of no. 1, but larger; capsule very firm, 6-angled, short-beaked; seeds in 2 rows in each cell. (*I. foliosa* Mack. & Bush.) — Rich low woods and shores, local, O. to Mo., and southw. to S. C., Fla., and Tex. May, June.

← ← *Claw and lower part of blade of sepals beaded.*

7. I. germánica L. (Fleur-de-lis.) Leaves broad, glaucous; spathes 2–3-flowered; perianth-tube greenish, cylindrical; sepals dark violet-purple, pendent with bright yellow beard; petals equaling the sepals in length and breadth, lilac; capsule trigonous. — Established in Va. and W. Va. (Introd. from Eu.)

* * *Stems low* (0.5–1.5 *dm. high*), *from tufted and creeping slender* (*or here and there tuberous-thickened*) *rootstocks*, 1–3-*flowered; tube of the perianth long and slender; the violet-blue sepals and petals nearly equal.*

8. I. vérna L. (Dwarf Iris.) *Leaves linear*, grass-like (3–10 mm. wide), rather glaucous; the thread-like tube about the length of the sepals and petals, which are oblong-obovate and on *slender claws*, the *sepals* slightly hairy down the orange-yellow base, *crestless; capsule obtusely triangular.* — Wooded hillsides, Pa. to Ky., and southw. Apr., May. — Flowers sometimes white with yellowish center.

9. **I. cristàta** Ait. (Crested Dwarf Iris.) *Leaves lanceolate* (1–2 dm. long when grown, 1–2 cm. broad); *those of the spathe ovate-lanceolate*, shorter than the *thread-like tube*, which is 4–5 cm. long and *much longer than the* light-blue obovate short-clawed *sepals and petals; sepals crested* but beardless; *capsule sharply triangular.* — Rich woods, Md. to Ga., locally w. to O., Ind., and Mo. Apr., May. — Flowers fragrant.

10. **I. lacústris** Nutt. (Lake Dwarf Iris.) *Tube rather shorter than the sepals and petals* (yellowish, 1–2 cm. long), *dilated upward*, not exceeding the spathe; otherwise as in the last, and too near it. — Gravelly shores of Lakes Huron, Michigan, and Superior. May.

2. NEMASTÌLIS Nutt.

Sepals and petals similar and nearly equal, spreading. Style short, its slender 2-parted branches exserted between the anthers; stigmas minute, terminal. Capsule obovoid, truncate, dehiscent at the summit. Seeds globose or angled. — Stems terete, with few plicate leaves, and few fugacious flowers from 2-bracted spathes. (Name from νῆμα, *a thread*, and στυλίς, *style*, for the slender style-branches.)

1. **N. acùta** (Bart.) Herb. Stem 1–6 dm. high; spathes 2-flowered; flowers pale blue-purple, 4–7 cm. broad, the divisions oblong-obovate; capsule 1–1.3 cm. long. (*N. geminiflora* Nutt.) — Prairies and barrens, Mo. to Tenn., La., and Tex. Apr.–June.

3. BELAMCÁNDA Adans. Blackberry Lily

Sepals and petals widely and equally spreading, all nearly alike, oblong with a narrowed base, naked. Stamens monadelphous only at base; anthers oblong. Style club-shaped, 3-cleft. Capsule pear-shaped; the valves at length falling away, leaving the central column covered with the globose black and fleshy-coated seeds, imitating a blackberry (whence the popular name). — Perennial, with rootstocks, foliage, etc., of an *Iris;* the branching stems (0.5–1 m. high) loosely many-flowered; the orange-yellow flower mottled with crimson-purple spots. (An East Indian name for the species.) Gemmingia Fabricius.

1. **B. chinénsis** (L.) DC. — Roadside thickets, open woods, etc., near towns, Ct. to Kan. and Ga.; common southw. June, July. (Nat. from Asia.)

4. SISYRÍNCHIUM L. Blue-eyed Grass

Sepals and petals (perianth) alike, spreading. Capsule globular, 3-angled. Seeds globular. — Low slender perennials, with fibrous roots, grassy or lanceolate leaves, 2-edged or winged stems, and fugacious umbeled-clustered small flowers from a usually 2-leaved spathe. (A meaningless name, of Greek origin.)

a. Spathes sessile and terminal *b.*
  b. Spathes 2, with a single outer leaf-like bract.
    Stems subterete, scarcely wing-margined; filaments free above; anthers 4.5 mm. long . . . . . 1. *S. hastile.*
    Stems flattened, distinctly wing-margined; filaments united to the summit; anthers at most 2.5 mm. long . . . . . 2. *S. albidum.*
  b. Spathes solitary.
    Flowers yellow . . . . . 3. *S. flaviflorum.*
    Flowers blue, violet, or white.
      Outer elongate bract with the margins free to the base; capsules pale . . . . . 4. *S. campestre.*
      Outer bract with the margins united above the base.
        Pedicels loosely spreading, much exceeding the inner bract; capsules 2–4 mm. high . . . . . 5. *S. mucronatum.*
        Pedicels suberect, scarcely exceeding the inner bract; capsules 4–6 mm. high.
          Capsules drab or dull brown . . . . . 6. *S. angustifolium.*
          Capsules whitish-green or straw-color . . . . . 7. *S. montanum.*

a. Spathes peduncled from the axil of the leaf-like bract *c.*
  c. Old leaf-bases persisting as tufts of straight bristle-like fibers.
    Capsules pale straw-color or whitish, 3–4 mm. high . . . . . 8. *S. Farwellii.*
    Capsules dark brown, 4–6 mm. high . . . . . 9. *S. arenicola.*
  c. Old leaf-bases soon deciduous, or, if persisting, merely loose irregular soft shreds *d.*
    d. Capsules pale straw-color or whitish; peduncles and pedicels strictly erect . . . . . 10. *S. strictum.*
    d. Capsules brown or drab.
      Inner bract of the spathe 1.5–3 cm. long; stems broadly winged.
        Pedicels loosely spreading, much exceeding the inner bract . 11. *S. gramineum.*
        Pedicels strongly ascending, rarely exceeding the inner bract . 6. *S. angustifolium.*
      Inner bract of the spathe 1–1.5 cm. long; stems slender and narrowly margined.
        Capsules not beaked . . . . . 12. *S. atlanticum.*
        Capsules tipped by a short stout mucro . . . . . 13. *S. apiculatum.*

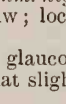
1. **S. hastìle** Bicknell. Stiff and erect, dull green, about 4 dm. high, the *stem* (1–1.5 mm. wide) *narrowly margined but not winged; leaves* firm and *stiff*, slender and *conduplicate*, barely 1 mm. broad, except at the flattened base; the 2 *spathes* closely sessile, each 4-bracted, the *lance-attenuate* strongly nerved *inner bracts* 1.5–2.5 cm. long, much exceeded by the linear outer bract; pedicels barely exserted beyond the inner bracts. — Sandy shores, Belle Isle, Detroit R., Mich. May, June.

603. S. albidum × 2/3.

2. **S. álbidum** Raf. Erect, pale green or glaucous, 1.5–4.5 dm. high; stems 1–3 mm. wide, usually twice exceeding the *flat leaves; spathes with lance-acuminate* pale or purple-tinged *inner bracts* (1.3–2.3 cm. long), usually twice exceeded by the erect outer bract; *pedicels with* slightly spreading *exserted tips; flowers* about 1 cm. long, *white to violet; capsules* subglobose (2.5–4 *mm. high*), *pale straw-color.* — O. and w. Ont. to Wisc., and southw; locally introd. in Ct. May, June. Fig. 603.

3. **S. flaviflòrum** Bicknell. Erect (2–2.5 dm. high), pale green or glaucous; stems flat, wing-margined, 1.5–3 mm. broad, usually exceeding the flat slightly broader leaves; bracts of the spathe pale green with conspicuous narrow hyaline margins, the inner bract 2–3 cm. long, twice exceeded by the outer; *pedicels shorter than the inner bract.* — Open woods, borders of prairies, w. Mo. May, June.

4. **S. campéstre** Bicknell. Caespitose, glaucous, slender (1–5 dm. high); the flat *stems* (1–3 *mm. broad*) *winged*, somewhat exceeding the leaves; *spathes gibbous, green or tinged with pink, the outer bract* (2.5–4.5 cm. long) *with margins free to the base, rarely twice exceeding the inner; pedicels* with curved tips, *equaling or exceeding the inner bract; perianth pale blue or white; capsules* 2–4 *mm. high.* — Prairies, Wisc. to N. Dak., and southw. Apr.–June. Fig. 604.


604. S. campestre × 2/3.

5. **S. mucronàtum** Michx. Similar but greener; *stems* 0.5–1.5 *mm. broad, narrowly winged*, usually twice longer than the slightly broader leaves; *spathes usually purple-tinged, not gibbous*, the *outer bract with the margins united a little above the base*, 2–7 cm. long, the *inner* 1–2 *cm. long; perianth violet* (rarely white); *capsules straw-color or greenish-yellow.* — Meadows, fields, and open woods, w. Mass. to Va. and Mich. May, June. Fig. 605.

605. S. mucronatum × 2/3.

6. **S. angustifòlium** Mill. Erect or ascending, *stiff*, glaucous, 1–5 dm. high; the simple (rarely forked) *stems* 1.5–3 *mm. wide, distinctly winged*, exceeding the scarcely broader leaves; *spathes green*, rarely purplish, *the outer bract with margins united* 3–6 *mm. above the base*, 2–6.5 cm. long, *the inner* 1–3 *cm. long;* perianth violet (rarely white); *capsules dull brown or purple-tinged.* — Meadows, fields, and damp sandy soil, Nfd. to B. C., s. to Va., Pa., Mich., Minn.; and in the Rocky Mts. May–July. Fig. 606.

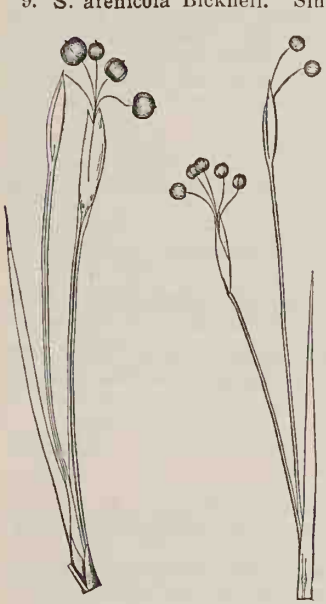
606. S. angustifolium × 2/3.

7. **S. montànum** Greene. Similar, pale green or glaucescent; *spathes pale green or straw-color*, the outer bract 3.5–8 cm. long, the inner 1.5–3.5 cm. long; *capsule whitish-green to straw-color.* — Gaspé Penins., Que.; Mich.; Minn.; Rocky Mts. June, July.

S. INTERMÈDIUM Bicknell appears to include inconstant and not very clearly marked forms intermediate between *S. mucronatum*, *S. angustifolium*, and *S. gramineum*.

8. **S. Farwéllii** Bicknell. *Loosely tufted*, from a *fibrous-sheathed base; stems flexuous, branched*, slightly glaucous, 2–3 dm. high, 1–2 *mm. broad*, winged, twice exceeding the slightly broader leaves; *bracteal leaf* loosely clasping, *shorter than the* (4–11 cm. long) *curved slender peduncles;* spathes 1.7–2 dm. long, the bracts subequal, yellowish-green, thin and membranous; *flowers pale blue, on flexuous exserted pedicels.* — Local, s. c. Mich.

9. **S. arenícola** Bicknell. Similar, but *usually blackening in drying*, and rather *stouter*, the *violet flowers on erect or* only *slightly curved pedicels.* — Sandy soil, near the coast, Mass. to N. J.



607. S. gramineum ×2/3. 608. S. atlanticum ×2/3.

10. **S. strictum** Bicknell. *Bright green*, 3 dm. high; the winged *stems* 1.5–2 *mm. wide*, slightly exceeding the scarcely broader leaves; *bracteal leaf* about *equaling the strict peduncles*, 6–9 cm. long; spathes 1.5–2 cm. long, pale green, tinged with purple, the bracts subequal, or the inner longer; *pedicels strict, barely exserted; flowers violet.* — Montcalm Co., Mich.

11. **S. gramíneum** Curtis. *Loosely tufted*, bright green or glaucescent, 1–5 dm. high, the ascending *flexuous or even geniculate broad-winged flat stems* 2–6 *mm. wide*, usually exceeding the grass-like leaves; bracteal leaf broad, usually shorter than the flat peduncles; *spathes green, erect*, the bracts subequal, 1.5–2 *cm. long*, or the outer somewhat elongated; *flowers blue; capsules subglobose*, 4–6 *mm. high.* (*S. acceps* Man. ed. 6; *S. graminoides* Bicknell.) — Wet meadows and damp woods, N. H. to Minn., and southw. Apr.–June. FIG. 607.

12. **S. atlánticum** Bicknell. *Loosely tufted, pale and glaucous*, 2–7 dm. high; *stems wiry* and slender, *flexuous or geniculate*, narrowly margined, 1–3 *mm. wide*, much exceeding the narrow leaves; bracteal leaf usually shorter than the slender peduncles; *spathes often oblique and tinged with pink*, the subequal *bracts* thin, 1–1.5 *cm. long, the outer acute, the inner obtuse; pedicels erect, scarcely exserted;* perianth violet; *capsules* slightly higher than broad, 3–4.5 *mm. high.* — Damp soil, Me. to Vt. and Fla., mostly on the coastal plain. FIG. 608.

609. S. apiculatum ×2/3.

13. **S. apiculàtum** Bicknell. Similar; stems 3 dm. high, nearly or quite twice as long as the narrowly linear grass-like basal leaves; the *pedicels* (1–1.8 cm. long) *distinctly exserted*, and the rather *smaller capsules tipped by stout short beaks.* — Lake shores, etc., Muskegon Co., Mich. FIG. 609.

MARANTÀCEAE (Arrowroot Family)

Herbs with distichous pinnately veined commonly asymmetrical leaves, irregular perfect flowers, and strongly reduced asymmetrical androecium, only one half of one anther polleniferous, the other half as well as the anthers of the remaining stamens sterile and petaloid. — Ovary inferior; cells 3 or by abortion fewer, 1-ovuled. Style single, more or less unilateral or declined. Seeds arillate, embryo curved in copious albumen.

1. THÀLIA L.

Erect scapose aquatic herbs with ovate-lanceolate long-petioled leaves, colored caducous bracts, and open panicles of showy usually purple flowers. Sepals 3, equal or nearly so, usually much shorter than the 3 nearly or quite distinct petals. Staminodia somewhat connate, petaloid, one of them enlarged, deflexed and lip-like. (Named for *Johann Thal,* a German physician and naturalist who died in 1583.)

1. **T. dealbàta** Roscoe. White-powdery; scapes 1–2 m. high; leaf-blades ovate-lanceolate, acute at apex, rounded or subcordate at base; corolla and bracts pale blue, the staminodia purple or violet. — Marshes, Mo. to S. C. and Tex.

BURMANNIÀCEAE (Burmannia Family)

Small annual herbs, often with minute and scale-like leaves, or those at the root grass-like; the flowers perfect, with a 6-cleft corolla-like perianth, the tube of which adheres to the 1-celled or 3-celled ovary; stamens 3 and distinct, opposite the inner divisions of the perianth; capsule many-seeded, the seeds very minute. — A small, chiefly tropical family.

1. BURMÁNNIA L.

Ovary 3-celled, with the thick placentae in the axis. Filaments 3, very short. Style slender; stigma capitate-3-lobed. Capsule often 3-winged. (Named for *J. Burmann*, an early Dutch botanist.)

1. **B. biflòra** L. Slender (7–12 cm. high), 1–several-flowered; perianth (5 mm. long) bright blue, 3-winged. — Peaty bogs, Va. to Fla. and La.

ORCHIDÀCEAE (Orchis Family)

Revised by Oakes Ames

Herbs, distinguished by perfect zygomorphic gynandrous flowers, with 6-merous (sometimes apparently 5-merous) *perianth adnate to the 1-celled ovary, with innumerable ovules on 3 parietal placentae, and with either 1 or 2 fertile stamens, the pollen cohering in masses.* Perianth usually of 6 divisions; the 3 outer (sepals) mostly of the same texture as the 3 inner (petals). Of the inner series, one, termed the lip, differs from the rest in shape, and is sometimes prolonged at the base into a spur. The lip is really the posterior petal, but by a twist of the pedicel or ovary of half a turn it is more commonly directed downward and becomes apparently anterior. At the base of the lip, in the axis of the flower, is the column, composed of a single fertile stamen, or, in

Cypripedium, of two stamens and the rudiment of a third, variously coalescent with the style. Anther 2-celled, each cell containing one or more masses of pollen (*pollinia*), or the pollen granular (in *Cypripedium*). Stigma viscid or (in *Cypripedium*) rough. Fruit a 1-celled 3-valved capsule. Flowers solitary, racemed, or spiked, often showy, each flower usually subtended by a bract. Leaves parallel-nerved, solitary, or several and alternate, sometimes apparently opposite or whorled. Perennials, often with corms or with tuberoid roots; sometimes rootless saprophytes. — A cosmopolitan family comprising about 7000 species largely dependent on insects for pollination.

I. Fertile anthers 2.

Tribe I. CYPRIPEDÌEAE. Perfect anthers lateral, the sterile one forming a dilated fleshy appendage above the terminal stigma. Pollen granular, not in masses.

1. **Cypripedium.** Stems more or less leafy. Perianth spreading; lip an inflated sac.

II. Fertile anther solitary.

* Anthers persistent.

Tribe II. OPHRÝDEAE. Pollinia prolonged at the base of the anthers into filaments or candicles which are attached to viscid disks or glands.

2. **Orchis.** Viscid disks contained in a pouch, or bursicule, of the rostellum.
3. **Habenaria.** Viscid disks naked, not contained in a pouch, or bursicule, of the rostellum.

* * Anthers caducous or readily detachable.

Tribe III. NEOTTÌEAE. Pollen-masses usually soft or granulose.

+ Anther terminal.

4. **Pogonia.** Lip without hypochil, free. Column not winged.
5. **Calopogon.** Lip without hypochil, free. Column winged at apex.
6. **Arethusa.** Lip without hypochil, united to the base of the gynostemium. Column winged to the base.
7. **Serapias.** Lip provided with a hypochil.

+ + Anther dorsal.

++ Upper sepal and petals connivent or lightly adherent.

8. **Spiranthes.** Pollen waxy or powdery, not divided into a large number of definite masses. Lip with appendages at the base; not saccate.
9. **Epipactis.** Pollen divided into a large number of definite masses. Lip saccate, unappendaged.

++ ++ Sepals and petals free.

10. **Listera.** Lip retuse or cleft.

Tribe IV. EPIDÉNDREAE. Pollen-masses smooth and waxy.

= Pollen-masses 4, unappendaged.

a. Leafless plants.

11. **Corallorrhiza.** Plants brownish or yellowish, with coralline rhizomes.

b. Plants with leaves.

12. **Malaxis.** Lip not saccate, cordate at base. Leaves several.
13. **Microstylis.** Lip not saccate. Leaf solitary on the stem.
14. **Liparis.** Lip not saccate, obovate. Leaves several.
15. **Calypso.** Lip saccate. Leaf solitary.
16. **Aplectrum.** Lip not saccate. Leaf solitary from a tuber.

= = Pollen-masses 4, each attached by a very short filament to the viscid disk or gland.

17. **Tipularia.** Flowers small, greenish, in a many-flowered raceme. Lip 3-lobed.

= = = Pollen-masses 8.

18. **Hexalectris.** Leafless plants.

Artificial Key to Genera

a. Two fertile anthers; lip an inflated sac . . . . . 1 Cypripedium.
a. One fertile anther *b.*
b. Flowers with a distinct slender spur (this at least 2 mm. long).
Leaves present at flowering time.
Caudicles of pollinia divergent, not contained in a special pouch or bursicule . . . . . 3. Habenaria.
Caudicles of pollinia convergent, contained in a special pouch or bursicule . . . . . 2. Orchis.
Leaves absent at flowering time . . . . . 17. Tipularia.
b. Flowers without a conspicuous spur, the lip sometimes saccate *c.*
c. Leaves one or more (in *Spiranthes*, *Arethusa*, and *Aplectrum* sometimes absent or inconspicuous at flowering time); plant green *d.*
d. Perianth at least 15 mm. across; sepals and petals more or less spreading, not strongly recurved *e.*
e. Leaves linear to linear-lanceolate, grass-like, sheathing the scape near the base.
Flowers several, resupinate, with one floral bract . . . . 5. Calopogon.
Flowers solitary, rarely 2, not resupinate, with 2 floral bracts, one posterior, the other anterior, subtending the ovary . 6. Arethusa.
e. Leaves elliptic-oblong, ovate, or cordate, sometimes whorled.
Lip saccate, bearded . . . . . 15. Calypso.
Lip not saccate, with a longitudinal more or less tuberculate crest or beard . . . . . 4. Pogonia.
Lip saccate, not bearded . . . . . 7. Serapias.
d. Perianth less than 15 mm. across; sepals and petals connivent or spreading.
Petals joined to the upper sepal but not coalescent with it.
Lip saccate at base, devoid of basal callosities; leaves variegated 9. Epipactis.
Lip not distinctly saccate, with a horn-like callosity within on each side at base; leaves not variegated . . . . . 8. Spiranthes.
Petals and sepals free.
Petals filiform or linear, less than 2 mm. broad.
Leaf solitary . . . . . 13. Microstylis.
Leaves 2, near the middle of the stem . . . . . 10. Listera.
Leaves 2, basal; lip not pointed . . . . . 14. Liparis.
Leaves basal; lip pointed . . . . . 12. Malaxis.
Petals not filiform, at least 2 mm. broad . . . . . 16. Aplectrum.
c. Leaves wanting; scaly saprophytes with yellowish or purplish stems.
Lip with a callus on each side of the mid-nerve at base . . . . 11. Corallorrhiza.
Lip with 5 or 6 longitudinal crests . . . . . 18. Hexalectris.

1. CYPRIPÈDIUM L. Lady's Slipper. Moccasin Flower

Sepals spreading, all three distinct or in most cases two of them united into one under the inflated sac-like lip. Petals mostly spreading, linear or oblong. Column declined, on each side a fertile stamen with its short filament bearing a 2-celled anther; pollen loose and pulpy or powdery-granular, the face of the anther converted into a viscid film; on the upper side of the column a dilated petaloid, but thickish staminode, or infertile stamen; stigma terminal, obscurely 3-lobed, moist and roughish. — Roots coarsely fibrous. Leaves many-nerved and plaited, sheathing at the base. Stems pubescent. Flowers solitary or few, large and showy. (Name incorrectly Latinized from Κύπρις, *Venus*, and πέδιλον, *a shoe*, therefore by some authors spelled *Cypripedilum*.)

§ 1. *The three sepals separate.*

1. C. arietinum R. Br. (Ram's Head L.) Stem slender, 15–30 cm. high; leaves 3 or 4, elliptic-lanceolate, nearly glabrous; upper sepal ovate-lanceolate, acute, lower sepals and the petals linear, similar, madder-purple, 1.5–2 cm. long, exceeding the whitish crimson-veined lip, which is silky pubescent within. (*Criosanthes borealis* Raf.) — Swamps and rich woods, rare and local, Que. to Man., s. to Me., Mass., N. Y., and Minn. May, June. (China.)

§ 2. *The two lower sepals united.*

* *Stem elongated, leafy to the top, 1–3-flowered; lip slipper-shaped, not fissured in front, but with a rounded open orifice.*

+ *Sepals and linear twisted petals acute, longer than the lip.*

++ *Lip yellow.*

2. C. parviflorum Salisb. (Smaller Yellow L.) Stem 19–60 cm. high; petals and sepals greenish, much suffused with madder-purple, 3–5 cm. long;

lip 2–3 *cm. long.* — Mostly in swampy or boggy places. — Frequently indistinguishable from the following variety, into which it seems to pass. Both the species and the variety widely distributed throughout our range. May–July.

Var. **pubéscens** (Willd.) Knight. (LARGER YELLOW L.) Stem 23–70 cm. high; leaves oval, acute, 11–20 cm. long, 5–11 cm. wide, mostly distant on the stem at anthesis; sepals ovate-lanceolate, greenish-yellow, dotted and streaked with madder-purple markings, usually exceeding 5 cm. in length; *lip* golden-yellow, 3.5–5 *cm. long.* (*C. pubescens* Willd.; *C. hirsutum* auth., not Mill.) — Mostly in woods.

+ + *Lip white.*

3. **C. cándidum** Muhl. (SMALL WHITE L.) Stem 16–28 cm. high, 1-flowered; leaves oval-lanceolate, acute, mostly crowded at anthesis; petals and sepals greenish, spotted with madder-purple; sepals ovate-lanceolate; lip 18–20 mm. long, striped with purple inside at base. — Swamps, N. Y. and N. J. to s. Minn., n. e. Neb., s. to Mo. and Ky. May, June.

+ + *Sepals and petals not twisted, shorter than the lip, or nearly equaling it.*

4. **C. hirsùtum** Mill. (SHOWY L.) *Stem* 4–8 *dm. high,* hirsute; leaves ovate, acute; sepals round-ovate, or orbicular, rather longer than the oblong petals; lip much inflated, white, crimson-magenta in front, about 4 cm. long. (*C. spectabile* Salisb.) — Swamps and wet mossy woods, Nfd. to Ga. and Wisc. June, July.

5. **C. passerìnum** Richards. *Stem about* 2 *dm. high,* villous-pubescent; leaves elliptic-lanceolate, acute; upper sepal yellowish, nearly orbicular, about 1.5 cm. long; lip spherical, pale magenta, spotted with deep magenta at the base within. — Woods, n. Ont.; L. Superior, westw. and northwestw.

* * *Stems short, 2-leaved; leaves basal, next the ground; scape terminated by a solitary bract, 1-flowered; sepals and petals greenish-brown, shorter than the drooping lip, which is fissured in front.*

6. **C. acaúle** Ait. (STEMLESS L.) Leaves oval; scape 15–38 cm. high; sepals ovate-lanceolate, nearly as long as the linear-lanceolate petals; lip obovoid, crimson-pink (rarely white, and petals yellow-green), nearly 5 cm. long, veiny; staminode rhomboid. (*Fissipes* Small.) — Dry woods, Nfd. to Minn., Winnipeg, and northwestw.; s. to N. C. and Tenn. May, June.

2. ÓRCHIS [Tourn.] L.

Flowers ringent. Sepals and petals nearly equal. Lip turned downward, coalescing with the base of the column, spurred below. Anther-cells contiguous and parallel. Pollen cohering in numerous coarse waxy grains, which are collected on a cobwebby elastic tissue into two large masses (one filling each anther cell) borne on slender stalks, the bases of which are attached to the glands or viscid disks of the stigma; the two glands contained in a common little pouch, or bursicule, placed just above the orifice of the spur. Flowers magenta-pink, showy, in a loose raceme. Leaves one or two. (Ὄρχις, the ancient name.)

610. O. rotundifolia × 1.

1. **O. rotundifòlia** Banks. *Leaf solitary,* varying from almost orbicular to oblong, 3–8 cm. long; scape naked, 12–23 cm. high; flowers magenta; lip white, spotted with magenta, 3-lobed (the lateral lobes oblong and the larger middle lobe dilated and notched at the apex), 6–8 mm. long, exceeding in length the ovate-oblong petals and sepals and the slender depending spur. (*Habenaria* Richards.) — Damp woods and swamps, local, e. Que. to N. Y., Wisc., northw. and northwestw. June, July. FIG. 610.

2. **O. spectábilis** L. (SHOWY O.) *Leaves two,* basal, oblong-obovate, shining, 7–15 cm. long; scape 4–5-angled, 4–17 cm. high; bracts leaf-like, lanceolate; floral bracts exceeding the flowers; sepals and petals contiguous, forming a vaulted galea behind the column; lip ovate, white, or rarely magenta-pink, undivided. (*Galeorchis* Rydb.) — Rich woods, N. B. and N. E., s. to Ga., westw. to Mo. and Dak. May, June.

3. HABENÀRIA Willd. Rein Orchis. Fringed Orchis

Flowers usually small, in loose or dense racemes. Sepals spreading, mostly similar; petals erect, connivent with the upper sepal. Lip entire, toothed or fringed laterally, or tripartite, the divisions wedge-shaped and variously toothed or fimbriate. Spur shorter or longer than the lip. Glands or viscid disks (to which the pollen masses are attached) naked and exposed, separate, sometimes widely so. In some of our species the stigma has two or three appendages. — Glabrous plants with one or more leaves. Tuberoids elongated, fusiform, or (in no. 1) somewhat palmate. (Name from *habena*, a thong or rein, in allusion to the shape of the lip or spur of some species.) An amphigean genus often separated by authors into numerous genera.

* *Lip not fringed.*

← *Leaves cauline, several, at least more than two.*

↔ *Lip 3-toothed at the apex.*

1. **H. bracteàta** (Willd.) R. Br. Stem 15–60 cm. high, rather stout; lower leaves oblanceolate to obovate, the upper oblong to lanceolate, acute; floral bracts 2–4 times the length of the green flowers; raceme 10–30-flowered; petals linear; *lip* oblong or slightly spatulate, 2–3-*toothed at the apex*, more than twice the length of the saccate whitish spur; tuberoids somewhat palmate, the divisions elongated, tapering. (*Coeloglossum* Parl.) — Damp woods and thickets, N. S. to Alaska, s. to Wash., Minn., and Pa.; and along the mts. to N. C. May–Aug. (China and Japan.) Fig. 611.

611. H. bracteata × 1.

↔ ↔ *Lip hastate, with a tubercle at the base.*

2. **H. flàva** (L.) Gray. Stem 25–55 cm. high; leaves ovate-oblong or oblong-lanceolate, the uppermost linear-lanceolate, passing into the bracts of the elongated raceme; petals ovate; *lip truncate, sometimes retuse, with a tooth or protuberance on the median line near the base;* spur slender, 4–6 mm. long. (*H. virescens* Spreng.; *Perularia flava* Farwell.) — Wet places. N. S. to Minn., and common southw. June July. Fig. 612.

612. H. flava × 1⅓.

↔ ↔ ↔ *Lip lanceolate, entire.*

3. **H. hyperbòrea** (L.) R. Br. Stem leafy, leaves oblong-lanceolate; raceme loose or dense; flowers greenish; upper sepal ovate, lateral sepals somewhat lanceolate; petals lanceolate, erect; *lip lanceolate*, deflexed, or curved upwards; spur about as long as the lip, slender, or clavate at the apex; glands of the stigma orbicular. (*Limnorchis* Rydb.) — Peat bogs and wet cold woods, Nfd. to Alaska, southw. to Pa., Neb., and westw. June–Aug. (Iceland.) — A species variable in height, in the length and breadth of the leaves, in the size of the flowers, and in the relative length of the lip and spur; therefore supposed by some authors to include several species.

613. H. dilatata × 1.

4. **H. dilatàta** (Pursh) Gray. Similar to the preceding; *flowers white*, more delicate in texture; *lip lanceolate with a dilated rhomboidal base;* stigma narrow. (*Limnorchis* Rydb.) — Meadows, bogs, and wet woods, Nfd. to Alaska, N. J., Minn., and westw. May–Aug. (Iceland.) Fig. 613.

Var. **mèdia** (Rydb.) Ames. A greenish-flowered form of the species distinguishable by the rhomboidal base of the lip from *H. hyperborea*.

614. H. nivea × 1⅓.

5. **H. nívea** (Nutt.) Spreng. Stem slender, 3–6 dm. long; leaves numerous, the lower ones lance-linear, 10–16 cm. long, the others passing into linear bracts; raceme lax or dense; flowers white, numerous; *petals and lip narrowly oblong; spur slender, ascending*, as long as the white untwisted ovary;

appendages of the stigma oblong. (*Gymnadeniopsis* Rydb.) — Swamps along the coast, Del. to Fla., westw. to Ark. and Tex. June–Aug. Fig. 614.

← ← *Leaves cauline, one or two.*

↔ *Lip crenulate.*

6. **H. íntegra** (Nutt.) Spreng. Stem about 37 cm. high, several-leaved; the lower leaves elongated, oblong-lanceolate, the others becoming smaller and bract-like; raceme densely many-flowered, cylindrical; *flowers small, yellow;* lip ovate, entire or slightly crenulate, or short-toothed along the margin, shorter than the awl-shaped descending spur; appendages of the stigma two, lateral, oblong, fleshy. (*Gymnadeniopsis* Rydb.) — Wet pine-barrens, N. J. to Fla., w. to Tenn. and Tex. July, Aug.

↔ ↔ *Lip 3-toothed at the apex.*

7. **H. clavellàta** (Michx.) Spreng. Stem 19–40 cm. high, slender, with one or two oblong or oblanceolate obtuse leaves, and two or three linear-lanceolate bracts above; raceme 3–16-flowered, subcylindric; flowers greenish-white; *lip wedge-oblong, truncate, with three short apical teeth or lobes;* spur slender, slightly clavate, curved upwards, longer than the ovary; appendages of the stigma 3, oblong, clavate-tuberculate, one outside each orbicular gland, and one between them rising as high as the anther-cells. (*H. tridentata* Hook.; *Gymnadeniopsis clavellata* Rydb.) — Bogs and moist soil, Nfd. to Minn. and southw. July, Aug. Fig. 615.

615. H. clavellata. Flower × 1. Lip × 1⅓. Column × 2.

← ← ← *Leaves radical.*

↔ *Lip less than 5 mm. long.*

8. **H. unalascénsis** (Spreng.) Wats. Plant slender, 3–5 dm. high, leafy at base; *leaves* oblanceolate, *withering before the flowers open;* sepals slightly gibbous at base, 1-nerved, narrowly oval, lateral ones adnate at base to the lip; petals lanceolate, obtuse; lip oblong-hastate; *spur filiform or slightly clavate, shorter than the ovary.* (*Piperia* Rydb.) — Damp woods, Anticosti I., Que.; Ont., westw. to Alaska and Cal. June–Sept.

↔ ↔ *Lip more than 5 mm. long.*

= *Spur about equal to the lip.*

9. **H. obtusàta** (Pursh) Richards. Plants 10–26 cm. high; *leaf solitary,* basal, obovate or spatulate-oblong; flowers greenish or whitish, 5–15 in a loose raceme at the summit of a naked scape; upper sepal broad and rounded, lateral sepals and the petals lance-oblong; lip entire, linear-lanceolate, deflexed, 6 mm. long, about the length of the tapering curved spur. (*Lysiella* Rydb.) — Swamps and rich woods, Nfd. to Alaska, s. to N. Y., Minn. and Col. July, Aug. (Eu.) Fig. 616.

616. H. obtusata × 1⅓.

= = *Spur two or more times longer than the lip.*

10. **H. Hookèri** Torr. Leaves orbicular or elliptical, near the ground, 3.5–10 cm. broad; *scape usually ebracteate,* 12–16 cm. high, having 8–20 upright yellowish-green flowers in a strict raceme 2–4 cm. through; sepals ovate-lanceolate, the upper sepal dilated at base, acuminate; *lip lanceolate, pointed, about 1 cm. long;* spur slender, acute, 2 cm. long. (*Lysias Hookeriana* Rydb.) — Dry or damp woods, e. Que. to Pa., w. to Minn. June, July. Fig. 617.

617. H. Hookeri × ⅔.

11. **H. orbiculàta** (Pursh) Torr. Leaves orbicular or elliptical, 6–19 cm. broad, spreading flat on the ground, shining above, silvery beneath; *scape with one or more lanceolate bracts,* 6–32 cm. high, having 10–20 or more greenish-white flowers in a loose raceme 4–6 cm. through; upper sepal orbicular, lateral

ones ovate; lip oblong-linear, obtuse, 1.5–2 cm. long; spur 1.5–2.5 cm. long, anther-cells strongly projecting at the free beak-like base; glands nearly 6 mm. apart. (*Lysias* Rydb.) — Rich deep woods, Lab. to Alaska, s. to S. C., Minn., and Wash. July, Aug.

12. **H. macrophýlla** Goldie. Similar to the preceding, but larger in all its parts; *spur 3–4 cm. long.* — Moist coniferous woods, Nfd. to Ont., s. to Ct. and Mich. June–Aug.

* * *Lip fringed, not divided or tripartite.* (*Blephariglottis* Raf.)

13. **H. cristàta** (Michx.) R. Br. Stem 2–6 dm. high; lower leaves linear-lanceolate, elongated, the upper becoming gradually reduced to acute bracts; floral bracts nearly as long as the orange-yellow flowers; raceme 2–3 cm. through; sepals elliptical; petals oblong, fringed at the top; *lip ovate*, copiously fringed, 5 mm. long; spur slender, 5–9 mm. long, longer than the lip. — Bogs, N. J. to Ark., and southw. July, Aug. Fig. 618.

618. H. cristata × 1⅔.

14. **H. ciliàris** (L.) R. Br. (Yellow Fringed O.) Stem 4–6 dm. high; leaves linear-oblong or lanceolate, the upper ones passing into pointed bracts shorter than the ovaries; raceme 4–6 cm. through; flowers orange-yellow; lateral sepals orbicular; petals linear-oblong or linear-lanceolate, toothed at the apex; *lip oblong*, 1 cm. long, copiously fringed, the basal segments often branched; spur 2–2.5 cm. long. — Peaty bogs and meadows, Vt. and Mass. to Mich., Mo., and southw. July, Aug.

15. **H. blephariglóttis** (Willd.) Torr. (White Fringed O.) Similar to the preceding in habit; flowers white; lateral sepals orbicular, upper sepal elliptical, concave; petals linear-oblong, somewhat pointed, cristate above or toothed; *lip narrowly ovate-lanceolate*, 8–10 mm. long, fringed, the segments once divided or simple; spur about 2 cm. long. — Bogs and peaty land, Nfd. to Fla., w. to Mich. and Miss. July, Aug. Fig. 619. Var. conspícua (Nash) Ames. Racemes lax; spur 4 cm. long. — Occurring southw. Var. holopétala (Lindl.) Gray. Petals narrower, with the toothing obsolete and the lip less fringed.

619. H. blephariglottis × 1.

× **H. Cánbyi** Ames. (*H. blephariglottis* × *H. cristata.*) Lip about 7 mm. long, deeply fringed; spur 12 mm. long. — Swamp near Lewes, Del., July, 1878 (*Canby*). Intermediate in color and size of flowers between the parent species.

* * * *Lip 3-parted, divisions toothed or fringed.*

← *Flowers greenish or whitish.*

↔ *Petals entire.*

16. **H. lácera** (Michx.) R. Br. (Ragged Fringed O.) Stems 3–6 dm. high; leaves oblong or lanceolate; raceme loose or dense, many-flowered; petals oblong, divisions of the lip narrow, deeply incised, the segments capillary; *spur about the length of the ovary*, 1.5 cm. long; glands oblong-linear, as long as the stalk of the pollen-masses. — Wet or moist open ground, Nfd. to Minn., southw. to Mo. and Ala. July, Aug. Fig. 620.

620. H. lacera × 1.

↔ ↔ *Petals minutely cut-toothed.*

17. **H. leucophaèa** (Nutt.) Gray. Stem 6–12 dm. high; leaves oblong-lanceolate; raceme commonly elongated, loose; the large flowers fragrant; petals obovate; divisions of the lip 17–20 mm. long, many cleft to the middle into a copious fringe; *spur 3.5 cm. long;* glands transversely oval. — Wet meadows and prairies, N. S. and Me. to Minn., southw. w. of the Allegheny Mts. to La. June, July.

+ + *Flowers pale or deep magenta (purplish).*

18. **H. psycòdes** (L.) Sw. Usually about 5 dm. high; lower leaves 2–4, oval to lanceolate or oblanceolate, passing into the linear-lanceolate bracts; raceme cylindrical, about 3–3.5 cm. through, often densely many-flowered; lower sepals round-oval; petals variable, mostly wedge-obovate to spatulate, more or less denticulate; lip spreading, 3-parted, usually 1–1.2 cm. broad, the three divisions mostly fringed less than $\frac{1}{3}$ their depth. — Wet open meadows and swamps, Nfd. to Minn., south w. to N. C. July, Aug. Fig. 621.

621. H. psycodes × 1.

× **H. Andréwsii** White. (*H. lacera* × *H. psycodes.*) Lower leaves as in *H. lacera;* raceme loosely flowered; flowers white, rose-tinted; petals cuneate-spatulate, obtuse or slightly retuse, denticulate above; divisions of lip narrowly cuneate, deeply cleft as in *H. lacera.* — Pownal, Vt.; S. Chesterville, Me. July, Aug.

19. **H. fimbriàta** (Ait.) R. Br. Usually a little taller than the preceding species; lower leaves 3–5, oval to lanceolate and oblanceolate, passing into lanceolate bracts; spike usually subcylindrical, mostly 5–6 cm. through, loosely flowered; lower sepals ovate; petals more or less oblong, denticulate; lip usually 1.8–2 cm. wide, 3-parted; the divisions mostly fringed to $\frac{1}{3}$ of their depth or more. (*H. grandiflora* Torr.) — Rich wet deciduous woods and borders, Nfd. to N. Y.; southw. in the mts. to N. C. Late June to early Aug. — Most obviously distinguished from *H. psycodes* by the larger paler flowers and greater diameter of the raceme; leaves broader; generally blooming somewhat earlier than *H. psycodes.*

20. **H. peramoèna** Gray. Lower leaves oblong-ovate, the upper lanceolate; spike cylindrical, densely flowered; lower sepals round-ovate; petals rounded-obovate, raised on a claw; *divisions of the large lip very broadly wedge-shaped, irregularly eroded-toothed* at the broadly dilated summit, *the lateral ones truncate, the middle one 2-lobed.* — Moist meadows and banks, Pa. and N. J. to Ill., s. to Mo.; and in the mts. to Ala. June–Aug. — Flowers large and showy (violet-purple); lip 16–20 mm. long, variably toothed, but not fringed.

4. POGÒNIA Juss.

Sepals and petals free. Lip papillose-crested. Column free, slender below the summit; anther terminal, operculate, with a distinct stalk, fleshy, thick; pollen-masses 2, powdery-granular, without caudicles or gland. (Πωγωνίας, *bearded*, from the lip of some of the original species.)

* *Lip lacerate-toothed, otherwise not lobed.*

622. P. ophioglossoides × $\frac{1}{3}$.

1. **P. ophioglossoìdes** (L.) Ker. Plants 1–3 dm. or more high, glabrous, bearing a single oval or lance-ovate leaf near the middle and a bract below the usually solitary terminal flower; sepals narrowly oval, about 2 cm. long; petals similar, but broader; lip spatulate, inclosing the column at base; crest yellow to white, otherwise the flowers magenta-pink, very rarely white. — Bogs, Nfd. to Minn., southw. to Fla. June, July. Fig. 622

* * *Lip three-lobed, merely fimbrillate-margined.*

+ *Leaves several, distinctly alternate, not whorled.*

2. **P. trianthóphora** (Sw.) BSP. Plants 3–20 cm. high, from ovoid or subcylindrical tuberoids; leaves 1–4, broadly ovate, about 1 cm. long; flowers several, drooping, transitory, borne in the axils of the upper leaves, on slender pedicels; perianth about 15 mm. long; lip ovate, slightly papillose along the middle, lateral lobes obtuse. (*P. pendula* Lindl.; *Triphora pendula* Nutt.) — Woods, Me. to Wisc. and Mo., southw. Aug.

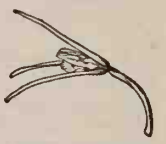
← ← *Leaf solitary.*

3. **P. divaricàta** (L.) R. Br. Plants 3–6 dm. high, bearing above the middle an oblong-lanceolate leaf 6–18 cm. long, and next the flower a leafy bract; sepals brownish, ascending, linear-lanceolate, 4–5 cm. long, exceeding the spatulate magenta-pink or whitish petals; lip wedge-oblong, the lobes apical and rounded, with a linear-grooved partly papillose crest along the middle. — Swamps and moist pine-barrens, N. J. to Ga. May, June. FIG. 623.

623. P. divaricata × ⅓.

← ← ← *Leaves 5 in a whorl at the top of the stem.*

4. **P. verticillàta** (Willd.) Nutt. Plants 2–3 dm. high, naked except for a few scales at base and a whorl of five obovate or lanceolate sessile leaves at the summit; flowers solitary, rarely 2; sepals madder-purple, linear, conduplicate, 4.5 cm. long; petals oblong-lanceolate; lip wedge-oblong, 3-lobed near the apex, with a linear partly papillose crest down the middle; leaves about 4 cm. long at flowering time, larger when the erect fruit matures. (*Isotria* Raf.) — Woods, N. E. to Fla. w. to Wisc.; not common. May, June. FIG. 624.



624. P. verticillata × ⅓.

5. **P. affìnis** Aust. Plants about 2 dm. high; leaves narrower than in the preceding, 2–5 cm. long; flowers (not rarely in pairs) yellowish or greenish; peduncle much shorter than the ovary and capsules; sepals as long as or longer than the petals, somewhat narrowed at base; lip crested over the whole face and on the middle of the lobes. (*Isotria* Rydb.) — Woods, very local, Vt. (*Mrs. Henry Holt*) and Mass. to N. J. and Pa.

5. CALOPÒGON R. Br.

Flowers in a loose raceme, resupinate. Sepals and petals spreading, distinct. Lip linear-oblong at base, dilated and bearded above with numerous clavate hairs, papillose at the apex. Column free, slender, winged at the summit; anther terminal, operculate; pollen-masses 4 (2 in each anther-cell); pollen-grains connected by filaments. Scape from a solid bulb, sheathed below by the base of the solitary grass-like leaf, naked above. (Name composed of καλός, *beautiful*, and πώγων, *beard*, from the bearded lip.) LIMODORUM L., in part.

1. **C. pulchéllus** (Sw.) R. Br. Plant 15–40 cm. high; raceme 4–12-flowered; flowers magenta-crimson, rarely white; lateral sepals ovate-lanceolate, falcate, upper sepal narrower; petals lanceolate, obtuse, constricted near the middle; lip as if hinged at base, its hairs yellow and magenta-crimson. — In open bogs and meadows, Nfd. to Fla., w. to Minn. and Mo. July (in our range).

6. ARETHÙSA [Gronov.] L.

Flowers ringent. Sepals and petals nearly alike, erect, united at base, arching over the column. Lip partly erect, the apical half abruptly recurved. Column adherent to the lip, dilated above, petal-like; anther lid-like, attached by a well defined membrane, 2-celled; pollen-masses 2 in each cell of the anther, powdery, granular. — Scape smooth from a solid white or greenish bulb. Leaf solitary, linear, nerved, hidden in the sheaths of the scape, protruding after the flower opens. (Named for the nymph *Arethusa*.)

1. **A. bulbòsa** L. Plant 10–25 cm. high from an ovoid bulb; scape terminated by a solitary flower 2.5–5 cm. long, rarely 2-flowered; sepals and petals magenta-pink, rarely white, the former oblong, acute or obtuse, the lateral ones falcate, the petals oblong, obtuse or obscurely pointed; lip oblong, narrowed toward the base, with 3–5 fringed yellow or white crests; margin of lip fimbrillate, spotted and striated with magenta-crimson or plain; column denticulate or

toothed at the dilated apex; stigma protuberant, turned down. — Bogs, Nfd. to Ont. and Minn., Pa., and mts. of S. C. May, June.

7. SERÀPIAS L.

Flowers in a loose or somewhat dense bracteose raceme. Sepals ovate-lanceolate, strongly keeled. Petals shorter, ovate, acute. Lip strongly saccate at base, the apical part broadly cordate, acute, with a raised acallus in the middle and two inconspicuous nipple-like protuberances on each side near the point of union with the sac. Column broad at the top, the basal part narrower; anther sessile, behind the broad truncate stigma on a slender-jointed base; pollen farinaceous, becoming attached to the gland capping the small rounded beak of the stigma. — Stem leafy. (Named for the Egyptian deity *Serapis*.) EPIPACTIS of auth., not Boehm.

625. S. Helleborine × ⅔.

1. **S. Helleborìne** L. Plants 25–60 cm. high; leaves clasping the stem, conspicuously nerved, broadly ovate to lanceolate, acute; perianth about 8 mm. long, green suffused with madder-purple; lip similarly colored, but darker within, the apical portion as if jointed with the sac, bituberculate at base. (*Epipactis* Crantz; *E. latifolia* All.; *E. viridiflora* Reichenb.) — Rare and local, Que. and Ont. to Mass., N. Y., and Pa. — Probably introduced from Europe in early times on account of supposed medicinal value. July–Aug. (Eu.) FIG. 625.

8. SPIRÁNTHES Richard. LADIES' TRESSES

Perianth somewhat ringent. Lateral sepals lanceolate, the upper sepal united with the oblong petals. Lip short-stalked, with a callus protuberant within on each side of the base, the somewhat dilated summit spreading or recurved, crisped, wavy, or rarely toothed or lobed. Column short, bearing the ovate stigma on the front, and the sessile or short-stalked (mostly acute or pointed) 2-celled erect anther on the back; pollen-masses 2 (1 in each cell), narrowly obovoid, each 2-cleft and split into thin and tender plates of granular pollen united by elastic filaments, coherent to the narrow viscid gland, which is set in the slender or tapering thin beak which terminates the column. After the removal of the gland, the beak is left as a 2-toothed or forked tip. — Roots clustered. Stem bracted above, leaf-bearing below or at the base. Flowers small, white, yellowish- or greenish-white in a more or less spirally twisted raceme (whence the name, from σπείρα, a coil or curl, and ἄνθος, a flower). GYROSTACHYS Pers.; IBIDIUM Salisb.

* *Flowers in a single rank, often secund.*

+ *Leaves fugacious, ovate or elliptic.*

++ *Root solitary; lip white.*

1. **S. Béckii** Lindl. Plants with a solitary subcylindrical or spindle-shaped root, and bearing a small slender raceme of white flowers; perianth 2–3 mm. long. (*S. simplex* Gray.) — Dry soil, near the coast, Mass. to Fla. and Tex., inland in the Miss. Valley to Ky. and Ark. Aug., Sept. FIG. 626. — Root of preceding year often persistent.

626. S. Beckii. × 1.

++ ++ *Roots fasciculate; lip green.*

2. **S. grácilis** (Bigel.) Beck. Plants from a cluster of thickened roots, slender, 2–8 dm. high, bearing a slender many-flowered mostly one-sided or spirally twisted raceme; perianth about 5 mm. long; lip greenish, with a white crisped margin. — Dry soil, N. S. to L. Winnipeg and Tex. July–Sept.

+ + *Leaves persistent, oblong-lanceolate to linear-lanceolate.*

++ *Lip ovate to ovate-oblong, pubescent beneath.*

3. **S. vernàlis** Engelm. & Gray. Plant 15–56 cm. high; roots elongated, fusiform; leaves 7–15 cm. long, 8–9 mm. wide, tapering to both ends, mostly

basal, the lower ones usually withering before flowering-time; scape smooth below, densely pubescent above; floral bracts longer than the ovaries, with distinct hyaline margins; raceme elongated, slender, 1-ranked, 8–15 cm. long; perianth 8–10 mm. long, yellowish. (*S. praecox* Man. ed. 6, in part.) — Dry soil along the coast, Mass. to Fla. and N. Mex.; northw. through the Miss. Valley to Ill. and Kan.; rare. Aug., Sept.

× **S. intermèdia** Ames (*S. gracilis* × *S. vernalis.*) Resembling *S. vernalis*, but slenderer throughout, with shorter narrowly elliptic-lanceolate leaves; lip nearly oblong, greenish with green callosities. — Dry fields, Easton, Mass. (*A. A. Eaton*).

↔ ↔ Lip oblong, smooth beneath.

4. **S. praècox** (Walt.) Wats. & Coult. Scape 4–8 dm. high, slender, glabrous below, slightly pubescent above; roots clustered, fleshy; leaves linear, grass-like, 1–2.5 dm. long, upper ones passing into acute sheathing hyaline-margined bracts; perianth 6–9 mm. long; flowers white, often veined with green, in more or less one-sided racemes. — A southern species, extending along the Atlantic coast from N. J. to Tex. Spring; Aug., Sept. at the North.

** * Flowers apparently in several ranks.*

← Lip not constricted, or only rarely so.

↔ Lip quadrate, yellow (May–July).

5. **S. lùcida** (H. H. Eaton) Ames. Scape 7–20 cm. high; leaves oblong or oblong-lanceolate, 9 cm. long, 1 cm. wide on the average, 3–5-nerved, contracted into a sheathing base; raceme slender, 2–7 cm. long; perianth 5–7 mm. long; lip yellowish. (*S. latifolia* Torr.; *Neottia lucida* H. H. Eaton.) — Moist banks. Me. to Ont. and Wisc., s. to Va. May–July.

↔ ↔ Lip ovate (Sept., Oct.).

6. **S. ovàlis** Lindl. Similar to the preceding in habit; perianth 4–5 mm. long; lip few-nerved, membranaceous. (*S. cernua*, var. *parviflora* Chapm.) — In shady moist woods and on high wooded hills, rare, Ill. and Mo. to Ga., Miss., and Tex. Sept., Oct.

↔ ↔ ↔ Lip ovate-oblong.

= Leaves mostly radical, lowermost longest.

7. **S. cérnua** (L.) Richard. Plants 14–38 cm. high, from slender fleshy roots, leafy below; leaves linear-lanceolate, variable, sometimes distinctly petioled; cauline bracts 4 or 5, usually closely appressed to the scape; scape pubescent above; floral bracts exceeding the ovaries by about half the length of the perianth; flowers in two or three spiral or vertical ranks; racemes 3–12 cm. long; perianth 7–10 mm. long; lip ovate-oblong, about as long as the sepals, apical margin crisped or erose. — Bogs and wet land, Nfd. to Ga., Minn., and Neb. Sept., Oct. — Very variable in size and foliage, often losing the root-leaves at flowering time. Var. OCHROLEÙCA (Rydb.) Ames. Growing in dry ground and blooming somewhat later, having greenish, cream-colored, or white flowers and longer floral bracts. — Me. to S. Dak., s. to Ga. and N. Mex. Sept., Oct.

= = Leaves extending up the stem.

8. **S. odòràta** (Nutt.) Lindl. Plant 4–10.5 dm. high; roots coarse, fleshy; leaves several, mostly basal, lanceolate, acute, about 12 cm. long, 2 cm. wide; perianth 8 mm. long, yellowish-white, often white, fragrant; basal half of the lip dilated, rhomboidal, tapering to the obtuse erose-margined apex, veined and suffused with greenish-yellow, callosities prominent. — Swamps and wet ground, Coast States, Va. to Tex. Sept.–Dec.

← ← Lip constricted at the middle or near the apex.

9. **S. Romanzoffiàna** Cham. Plants 8–47 cm. tall, from roots 5–8 mm. thick, leafy below and leafy-bracted above; leaves varying from oblong-lanceolate to linear; scape glandular-pubescent above; cauline bracts 2–3; raceme dense, cylindrical, variable in length; perianth yellowish or whitish, 6–12 mm. long;

bracts of the raceme often much longer than the flowers; sepals and petals all connivent, forming a galea above the column; lip pandurate, apex strongly recurved, callosities minute, globular. (Includes *Gyrostachys stricta* Rydb.) — Swamps and moist soil, Nfd. to Alaska, s. to Ct., N. Y., the Great Lake region, S. D., Col., Utah, and Cal. July–Sept. (Ireland.)

9. EPIPÁCTIS [Haller] Boehm. Rattlesnake Plantain

Lip saccate, with a straight or recurved tip, sessile, entire, without callosities at base. Upper sepal and the petals united into a hood over the lip. Anther borne on the back of the short column; pollen-masses 2, the narrow gland to which they are attached held between the forked or 2-toothed beak which terminates the column. — Root of thick fibres from a somewhat fleshy creeping rootstock. Leaves all basal, dark green, or reticulate-veined with white. Scape, raceme, and the whitish flowers glandular-downy. (Ancient Greek name of *Helleborus*.) Peramium Salisb. Goodyera, R. Br.

* *Raceme loosely flowered; saccate lip with an elongated tip and flaring or recurved margin.*

← *Flowers in a 1-sided raceme; anther short, blunt, or with a short blunt tip; beak shorter than the body of the stigma.*

1. **E. rèpens** (L.) Crantz. Stem 1–2.5 dm. high; leaves ovate to oblong-lanceolate, 1–3 cm. long, 5-nerved with subhorizontal dark veins; raceme about 4.5 cm. long; perianth 4 mm. long; lip strongly saccate, inflated, with a recurved tip. (*Goodyera* R. Br.) — An old world species, represented in eastern N. A. by the following variety.

627. E. repens, v. ophioides × 1⅔.

Var. **ophioìdes** (Fernald) A. A. Eaton. Generally a little lower than the species; veins of the leaves conspicuously bordered with white. — Cold mossy woods, Nfd. to Man., s. to N. E., N. Y., and Mich., and in the mts. to S. C. July, Aug. Fig. 627.

← ← *Flowers mostly in a loose spiral; anther acuminate; beak as long as, or longer than, the body of the stigma.*

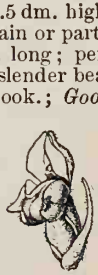
2. **E. tesselàta** (Lodd.) A. A. Eaton. Stem averaging 2 dm. high; leaves 3–8 cm. long, ovate to oblong-lanceolate, extremely variable, faintly or sometimes conspicuously penciled with white; raceme about 6 cm. long; perianth 5 mm. long. (*Goodyera* Lodd.) — In upland coniferous woods, Nfd. to Ont., s. to N. E. and N. Y. July, Aug.

628. E. decipiens × 1⅔.

* * *Raceme rather densely flowered, 1-sided; lip scarcely saccate, elongated, with the margin involute.*

3. **E. decìpiens** (Hook.) Ames. Stem stout, 3.5–4.5 dm. high; leaves 5–10 cm. long, ovate-lanceolate, dark green, plain or partly reticulate-veined with white; raceme about 10 cm. long; perianth 8–9 mm. long, anther ovate, long, acuminate; slender beak longer than the body of the stigma. — (*Spiranthes* Hook.; *Goodyera Menziesii* Lindl.) — Dry woods, e. Que. to B. C., s. to N. S., N. B., n. Me., L. Huron, and Ariz. and Cal. July, Aug. Fig. 628.

* * * *Raceme densely many-flowered; lip strongly saccate, with a short blunt tip, the margin not recurved or flaring.*



629. E. pubescens × 1⅔.

4. **E. pubéscens** (Willd.) A. A. Eaton. Stem stout, 1.5–4 dm. high; leaves dark green, ovate to ovate-lanceolate, 3–6.5 cm. long with 5 or 7 white nerves and many fine white reticulating veins; raceme about 7 (3–11) cm. long; perianth 4–5.5 mm. long; lip globose, ventricose; anther blunt; stigma with 2 short teeth. (*Goodyera* R. Br.) — Common; generally in dry coniferous woods, rarer in deciduous woods, N E. to Fla. and Minn. Aug., Sept. Fig. 629.

10. LISTÈRA R. Br. Twayblade

Sepals and petals nearly alike, spreading or reflexed; lip mostly drooping, longer than the sepals, 2-lobed or 2-cleft at the summit. Column wingless. Stigma with a rounded beak; anther borne on the back of the column at the summit, erect, ovate; pollen powdery, in two masses, joined to a minute gland. — Roots fibrous. Stem bearing in the middle a pair of nearly opposite sessile leaves. The small flowers greenish or madder-purple in a terminal raceme. (Dedicated to *Martin Lister*, 1638–1711, a celebrated English naturalist.)

* *Column very short (0.5 mm. or less); lip not dilated above.*

← *Lip with a tooth on each side at base; raceme glabrous.*

1. **L. cordàta** (L.) R. Br. Leaves round-ovate, somewhat heart-shaped, 12–25 mm. long; stem pubescent just above the leaves; flowers about 3 mm. across, on pedicels not longer than the ovary; lip narrowly oblong, 2-cleft. — Mossy woods and swamps, Lab. to N. J., w. to Mich., Col., and Cal., northw. to the Arctic coast. (Grecnl., Iceland, Eu., and Japan.) Fig. 630.

630. L. cordata × 1⅔.

← ← *Lip not toothed at base; raceme glandular.*

2. **L. austràlis** Lindl. Leaves ovate; raceme loose and slender; flowers small, on minutely glandular-pubescent pedicels which equal or exceed the glabrous ovaries; lip linear, 6–10 mm. long, cleft one third to two thirds the way down into linear-setaceous divisions. — Shady woods, La. and Fla. to N. J.; Oswego Co., N. Y.; Ottawa, Ont.

* * *Column 2–3 mm. long.*

← *Lip auriculate at base, more or less ciliate.*

3. **L. auriculàta** Wiegand. Leaves elliptic-oval or elliptic-ovate, 35–50 mm. long, inserted above the middle of the stem; flowers numerous, in a loose raceme; rhachis pubescent; pedicels glabrous, mostly shorter than the glabrous ovaries; lip 6–8 mm. long, slightly ciliate, oblong, cleft one third to one fourth of its length, auricles incurved. — Cedar swamps and mossy banks, e. Que. to n. N. H. and n. Vt. Fig. 631.

631. L. auriculata × 1⅓.

← ← *Lip not auriculate at base.*

↔ *Ovary glandular.*

4. **L. convallarioìdes** (Sw.) Torr. Leaves oval or roundish and sometimes slightly heart-shaped, 3–5 cm. long; raceme many-flowered, loose; rhachis densely glandular-pubescent; pedicels glandular, slightly longer than the ovaries; lip 9–11 mm. long, ciliate on the margin, narrowly cuneate, retuse, lobes rounded, on each side of base a short triangular tooth. — Moist woods, Nfd. to n. N. E., Mich., and the Rocky Mts., westw. and northw. Fig. 632.

632. L. convallarioides × 1.

↔ ↔ *Ovary glabrous.*

5. **L. Smállii** Wiegand. Leaves borne at or below the middle of the stem, 15–25 mm. long, ovate-reniform, mucronate, often apiculate; raceme loose, few-flowered; rhachis glandular; pedicels glabrous, equaling or exceeding the ovaries in length; lip 9 mm. long, not ciliate, broadly obovate, cleft at the apex, on each side of base a curved oblong obtuse tooth. — Damp woods in the mts., Pa. to N. C. (E. Asia.)

11. CORALLORRHÌZA [Haller] R. Br. Coral Root

Perianth somewhat ringent, gibbous or obscurely spurred at base. Sepals and petals oblong-lanceolate, nearly alike, 1–3-nerved; lateral sepals ascending, forming with the lip the gibbosity or short spur which is mostly adnate to the

ovary. Lip slightly adherent to the base of the compressed column. Anther terminal; pollen-masses 4, soft-waxy, free. — Brownish or yellowish herbs destitute of green foliage, with much branched and toothed coral-like underground rootless stems, sending up a simple scape which has sheaths in place of leaves, and a raceme of lurid flowers. Fruit reflexed. (Name composed of κοράλλιον, *coral*, and ῥίζα, *root*.)

** Lip 3-lobed, or with a curved tooth on each side of base.*

+ Lip white, not spotted.

1. **C. trífida** Chatelain. Plant slender, yellowish, 4–19 cm. high, 4–12-flowered; perianth 5 mm. long; lip white, somewhat hastately 3-lobed above the base, with thick rather short lamellae; spur a very small protuberance; capsule ovoid or ellipsoid, green until mature. (*C. innata* R. Br.; *C. Corallorrhiza* Karst.) — Wet shaded situations, Nfd. to Alaska, s. to N. J., Pa., O., Mich., Minn., and in the mts. to Ga. May–July. (Eurasia.) Fig. 633.

633. C. trifida × 2.

+ + Lip white, spotted with magenta-crimson.

2. **C. maculàta** Raf. Plant stout, madder-purple or yellowish, 2–4 dm. high, 10–30-flowered; perianth 5–18 mm. long; lip deeply 3-lobed, lateral lobes small, middle lobe rather square, rounded at the apex; two narrow longitudinal lamellae near middle of lip; column yellow, with magenta spots on the inner surface; capsule smooth, inflated, compressed. (*C. multiflora* Nutt.) — Woods. July, Aug. — Pale forms, without spots on the lip, petals or sepals, occur rarely.

** * Lip entire or margin denticulate.*

+ Lip without striations or conspicuous veins.

3. **C. Wisteriàna** Conrad. Plant 1.5–4 dm. high, yellowish or madder-purple; flowers 12–16 in a loose raceme; perianth about 7 mm. long; sepals and petals more or less spreading; lip 5 mm. long, 4 mm. broad, oval or suborbicular, retuse, margin denticulate or undulate; callosities linear. (*C. maculata* Greene, not Raf.) — Woods, Pa. and southw. Spring.

4. **C. odontorhìza** Nutt. Plant slender, bulbous-thickened at base, light brown or madder-purple, about 16 cm. high, 6–20-flowered; perianth about 4 mm. long; sepals and petals scarcely spreading, one-nerved; lip 2.5–3 mm. long, white, spotted with magenta-crimson, oval or broadly ovate, abruptly contracted at base, with two short inconspicuous lamellae; capsule globular or ovoid; column nearly as long as the petals. (Includes *C. micrantha* Chapm.) — Woods; a southern species extending sparingly northw. to s. Me., s. Ont. and Ill. Aug., Sept.

+ + Lip conspicuously striate-veined with madder-purple.

5. **C. striàta** Lindl. Plants stout, madder-purple, 15–40 cm. high, 15–25-flowered; perianth about 8 mm. long; sepals and petals with three madder-purple nerves; lip somewhat concave, ovate, with two short lamellae near the base; capsule cylindrical. — Woods; a northwestern species, rare and local as far east as Mich. and Ont. May, June.

12. MALÁXIS Soland.

Sepals lanceolate, spreading. Petals much smaller. Lip 3-nerved, lanceolate, apiculate, shorter than the lateral sepals. — Small plants with minute flowers in elongated racemes. (Μάλαξις, *a softening*, perhaps in allusion to the tender nature of the plant.)

1. **M. paludòsa** (L.) Sw. Scape filiform, 7–10 cm. high; leaves 2–5, basal, ovate, obtuse. — New York Mills, Otter Tail Co., Minn. (*H. L. Lyon*), the only American station known. (Eurasia.)

13. MICROSTÌYLIS (Nutt.) Eaton. Adder's Mouth

Sepals oblong, spreading. Petals filiform or linear, spreading. Lip auricled or ovate at base, narrowing toward the summit, entire or nearly so. Column very small, terete, with 2 teeth or auricles at the summit and the erect anther between them; pollen-masses 4, in one row (2 in each anther-cell), cohering in pairs, waxy, without stalks, filaments, or gland.—Low herbs from solid bulbs producing simple stems which bear a single leaf and a raceme of numerous minute greenish flowers. (Name composed of *μικρός*, *small*, and *στυλίς*, *a column* or *style*.) Achroanthes Raf. (without description).

634. M. monophyllos × 3⅓.

1. **M. monophýllos** (L.) Lindl. Scape slender, 10–15 cm. high, with a sheathing, ovate-elliptical leaf above base; raceme spiked, long and slender, about 7 mm. in diameter; *pedicels nearly equal to the ovaries in length; lip roundish at base, terminating in a long point.*—In damp shady woods or swamps, occasional from Que. to Man., s. to Pa., Ind., and Minn., rare southw. June, July. (Eurasia.) Fig. 634.

2. **M. unifòlia** (Michx.) BSP. Plant 7–22 cm. high; leaf near the middle, ovate, clasping; raceme short, 8–20 mm. in diameter; *pedicels much longer than the ovaries; lip truncate, 3-lobed at the summit*, the middle lobe small. (*M. ophioglossoides* Eaton.)—Occasional in bogs and woods, Nfd. to Man., and southw. July, Aug. Fig. 635.

635. M. unifolia × 3⅓.

14. LÍPARIS Richard. Twayblade

Sepals oblong-lanceolate. Petals linear or filiform. Lip entire. Column 2–3 mm. long, curved, stout at base, with narrow wings above; anther terminal, operculate; pollen-masses 4 (2 in each anther-cell), slightly united in pairs, without stalks, filaments, or gland.—Low herbs, with solid bulbs, producing two root-leaves and a low scape which bears a few-flowered raceme. (Name from *λιπαρός*, *fat* or *shining*, in allusion to the smooth or unctuous leaves.)

636. L. liliifolia × 2/3.

1. **L. liliifòlia** (L.) Richard. Plants 10–17 cm. high; leaves elliptical or ovate, acute or obtuse, glossy; scape angled; flowers 5–15; sepals oblong-lanceolate, similar; petals pendent, madder-purple; *lip wedge-obovate, translucent, madder-purple;* column with 2 gland-like tubercles on the inner face at base.—Woods, N. H. and Mass. to Minn., Mo., and Ala. June, July. Fig. 636.

2. **L. Loesèlii** (L.) Richard. Plants 8–22 cm. high; leaves elliptic-lanceolate or oblong, keeled; *lip obovate or oblong, 5 mm. long, yellowish-green;* column about 2 mm. long.—Swamps, damp fields, and moist thickets, rather local, becoming rare southw. June, July. (Eu.)

15. CALÝPSO Salisb.

Sepals and petals similar, ascending, spreading, oblong-lanceolate, acute, magenta-crimson, rarely white. Lip larger than the rest of the flower, saccate, with three longitudinal rows of yellow (or white) glass-like hairs in front and with a translucent apron-like appendage (formed by the overlapping of the lip) spotted with madder-purple, the sac (bearing two conspicuous horns at its base) whitish, with irregular purple-madder markings. Column winged, having the operculate anther just below the apex; pollen-masses waxy, 2, each 2-parted, all sessile on a square gland.—Leaf solitary. Scape one-flowered. (Named for the goddess *Calypso*.)

1. **C. bulbòsa** (L.) Oakes. Plant 6–18 cm. high; leaf oval or ovate, veiny, its margin wavy, the petiole triangular; scape smooth, with membranaceous sheathing bracts; both leaf and scape produced separately from the summit of a rounded or elongated corm; pedicel of the flower subtended by a petaloid

bract. (*C. borealis* Salisb.) — Deep mossy woods, across the continent northw., very locally south to n. N. E., Mich., Minn., Ariz., and Cal. May–July. (Eu.)

16. APLÉCTRUM (Nutt.) Torr. Putty-root. Adam-and-Eve

Perianth neither gibbous nor with any trace of a spur or sac at base. Lip free, 3-lobed, with three longitudinal crests. Column compressed; pollen-masses 4. — Scape about 4 dm. high, from near the summit of a globular bulb. Leaf solitary; petiole distinct. The slender naked rootstock produces each year a globular solid bulb or corm, often 2.5 cm. in diameter (filled with exceedingly glutinous matter), which sends up late in summer a large oval many-nerved plaited leaf lasting through the winter; early in the succeeding summer the scape appears, terminated by a loose raceme of lurid flowers. (The name is composed of α- privative, and πλῆκτρον, *a spur*, from the total want of the latter.)

637. A. hyemale × 2/3.

1. **A. hyemàle** (Muhl.) Torr. Flowers about 10; sepals oblong, greenish or yellowish, tinged with madder-purple; petals shorter, arching over the column, oblong, obtuse, yellowish, tinged with madder-purple above; lip white or nearly so, sparingly marked with magenta. (*A. Shortii* Rydb.) — Rich woods, Vt. to Sask., and southw., local. May, June. Fig. 637. — Pale forms occur devoid of markings on the perianth.

17. TIPULÀRIA Nutt. Crane Fly Orchis

Flowers greenish, tinged with madder-purple, numerous in an elongated loose bractless raceme. Sepals oblong-oval, obtuse, upper sepal narrower. Petals oblong, obtuse. Lip with a slender spur, 3-lobed; lateral lobes obtuse, obscurely toothed; apical lobes broad at base, margin deflexed at the middle, apex expanded. Column wingless; anther operculate, terminal; pollen-masses 2, waxy, each 2-parted, connected by a linear stalk with the transverse small gland. — Corms connected in a horizontal series, producing in autumn a single ovate slender-petioled nerved and plaited leaf, purplish beneath, and in summer a long slender scape. (Name from a fancied resemblance of the flowers to insects of the genus *Tipula*.)

638. T. discolor × 2/3.

1. **T. díscolor** (Pursh) Nutt. Leaf green above, purplish beneath, disappearing before the flowers are produced; scape 25–45 cm. high; spur about 2 cm. long, twice longer than the ovary. (*T. unifolia* BSP.) — A southern species, extending northw. to N. J.; reported but unverified from farther north. Fig. 638.

18. HEXALÉCTRIS Raf.

Sepals and petals nearly equal, free, somewhat spreading, several-nerved; perianth not gibbous or spurred at base. Lip obovate, 3-lobed, with 5 or 6 prominent ridges down the middle, the middle lobe somewhat concave. Pollen-masses 8, united into a single fascicle. — Leafless plants with stout or somewhat coralline annulated rootstocks. (Name probably derived from ἕξ, *six*, and ἐλεκτρυών, *a cock*, from the crest of the lip.)

639. H. aphylla × 2/3. Flower. Expanded lip.

1. **H. aphýlla** (Nutt.) Raf. Plants 3–6 dm. high, with short sheathing purplish scales; flowers racemed, bracteate, madder-purple, about 2 cm. long; sepals narrowly oval, obtuse; petals shorter, similar. (*Arethusa spicata* Walt. ?) — Rich woods, Ky., Mo., and southw. July, Aug. Fig. 639.

PIPERÀCEAE (Pepper Family)

Herbs, with joined stems, alternate entire leaves, and perfect flowers in spikes, entirely destitute of floral envelopes, and with 3–5 more or less separate or united ovaries; ovules few, orthotropous. — The characters are those of the Tribe *Saurureae*, the *Piperaceae* proper (wholly tropical) differing in having a 1-celled and 1-ovuled ovary.

1. SAURÙRUS [Plum.] L. Lizard's Tail

Stamens mostly 6 or 7, hypogynous, with distinct filaments. Fruit somewhat fleshy, wrinkled, of 3–4 indehiscent carpels united at base. Stigmas recurved. Seeds usually solitary, ascending. — Perennial marsh herbs, with heart-shaped converging-ribbed petioled leaves, without distinct stipules; flowers (each with a small bract adnate to or borne on the pedicel) crowded in a slender wand-like and naked-peduncled terminal spike or raceme (its appearance giving rise to the name, from σαῦρος, *a lizard*, and οὐρά, *tail*).

1. S. cérnuus L. Flowers white, fragrant; spike nodding at the end; bract lanceolate; filaments long and capillary. — Swamps and shallow water, near the coast, R. I. to Fla.; and from s. Ont. and O. to Minn. and southw. June–Aug.

SALICÀCEAE (Willow Family)

Dioecious (or by exception monoecious) *trees or shrubs, with both kinds of flowers in catkins, one to each bract (scale), without perianth; the fruit a 1-celled and 2–4-valved pod, with 2–4 parietal or basal placentae, bearing numerous seeds furnished with long silky down.* — Stigmas 2, often 2-lobed. Seeds ascending, anatropous, without albumen. Cotyledons flattened. Leaves alternate, undivided, with scale-like and deciduous, or else leaf-like and persistent, stipules. Wood soft and light; bark bitter.

1. **Salix.** Scales entire or merely toothed. Flowers with small glands at base; disk none. Stamens few. Stigmas short. Buds with a single scale.
2. **Populus.** Scales lacerate. Flowers with a broad or cup-shaped disk. Stamens numerous. Stigmas elongated. Buds covered by several scales.

1. SÀLIX [Tourn.] L. Willow. Osier

Sterile flowers of 3–10, mostly 2, distinct or united stamens, accompanied by 1 or 2 small glands. Fertile flowers also with a small flat gland at the base of the ovary; stigmas short. — Trees or shrubs, with mostly terete and lithe branches. Leaves mostly long and pointed, entire or glandular-toothed. Buds covered by a single scale, with an inner usually adherent membrane. Catkins appearing before or with the leaves. (The classical Latin name.) Species largely wind-pollinated and very freely hybridizing.

N. B. — In this genus, unless otherwise noted, the figures of the leaves are on a scale of $\frac{1}{3}$, while those of the fruit are on a scale of $3\frac{1}{3}$.

§ 1. *Aments borne on short lateral leafy branchlets; scales yellowish, falling before the capsules mature; filaments hairy below, all free; style very short or obsolete; stigmas thick, notched.*

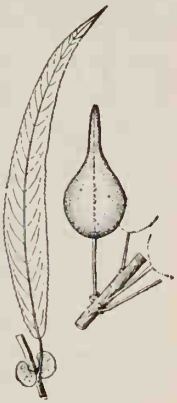
* *Stamens 3–5 or more.*

← *Leaves with no petiolar glands; sterile aments elongated, slender-cylindrical; flowers somewhat remotely subverticillate; scales crisp-villous on the inside.*

1. S. nìgra Marsh. (Black W.) Shrub, or, when well developed, a rough-barked tree 5–30 m. high; *leaves narrowly lanceolate, very long-attenuate from*

640. S. nigra.

near the roundish or acute base to the tip, often downy when young, at length *green and glabrous* except the *short* (2–6 *mm. long*) *petiole* and midrib, closely serrulate with fine incurved teeth; stipules large, semicordate, pointed and persistent, or small, ovate and deciduous; *scales soft-pubescent outside;* fruiting aments (3–7 cm. long) more or less dense; capsules ovoid-conical, gibbous below, glabrous, 3–5 mm. long, the wide-spreading slender pedicels 1–2 mm. long, much exceeding the gland. — Banks of streams and lakes, N. B. to Ont., Dak., and southw. Fig. 640. Var. FALCÀTA (Pursh) Torr. *Leaves* narrower and *scythe-shaped.* — Commoner northeastw.



641. S. Wardi.

2. **S. Wárdi** Bebb. (WARD'S W.) Similar; small tree; *leaves lanceolate or ovate-lanceolate, conspicuously glaucous and veined beneath; petioles* 2–7 *mm. long;* stipules large, round-reniform, persistent; aments long, loosely flowered, 5–11 cm. long; *scales glabrous outside except at base; capsules* globose-conical, 4.5–6 mm. long, *glandular-granulose.* (*S. nigra*, var. Bebb; *S. longipes* Britton, not Shuttlew.) — Rocky and gravelly shores, Md. to Va., Ky., and Mo. Fig. 641.

642. S. amygdaloides.

3. **S. amygdaloìdes** Anders. (PEACH-LEAVED W.) *Leaves lanceolate or ovate-lanceolate*, attenuate-cuspidate, *pale or glaucous beneath; petioles slender*, 1–3 *cm. long; stipules minute, very early deciduous; fertile aments becoming very loose in fruit*, 4–10 cm. long; capsule globose-conical, glabrous, 4–6 mm. long, slender-pediceled. — W. Que. and centr. N. Y. to B. C. and Tex.; common westw. Fig. 642.

+ + *Petioles glandular at apex; sterile aments thick, short-cylindrical or ellipsoid-ovoid, densely flowered; leaves lustrous above, glandular-serrate; branchlets lustrous.*

++ *Leaves green on both surfaces; fruit mature in early summer.*

= *Capsule conic-subulate; pedicel twice exceeding the gland; mature leaves short-acuminate.*

4. **S. PENTÁNDRA** L. (BAY-LEAVED W.) *Leaves ovate or oblong-ovate*, rounded at base, finely and closely glandular-serrate, *glabrous from the first*, in maturity 3.5–10 cm. long, 2–5 cm. broad; *staminate aments* 2.5–5 *cm. long*, 1–1.5 cm. thick, the fertile becoming 2.5–5 cm. long; the *mature straw-colored or pale brown* slightly lustrous *capsule rounded or cordate at base*, 5–8 *mm. long;* shrub or small tree. — Cultivated and rarely escaping, N. E. to O. (Introd. from Eu.) Fig. 643.

= = *Capsule conic-ovoid; pedicel* 3 *or* 4 *times exceeding the gland; mature leaves with long-acuminate curved tips.*

643. S. pentandra.

5. **S. lùcida** Muhl. (SHINING W.) *Leaves* ovate-lanceolate or narrower, finely serrate, *when young pubescent with crisp rufescent or sordid caducous hairs*, in maturity coriaceous, shining on both sides, 5–15 cm. long, 2–5 cm. broad; stipules small, oblong or semicircular; *staminate aments* 2–5 *cm. long;* fertile becoming 3–5 cm. long; the *straw-colored or pale-brown or greenish dull capsules rounded at base*, 4.5–6.5 *mm. long;* shrub or small tree. — Wet ground and

644. S. lucida.

banks of streams, Nfd. to Man., s. to Pa., Ill., and Neb. Fig. 644. Var. ANGUSTIFÒLIA Anders. *Leaves* glabrous, *elongate lanceolate*, 1–1.5 *cm. broad.* — Nfd. and e. Can.

Var. intónsa Fernald. *Branchlets* of the first year *and under surfaces of the elliptic-lanceolate* attenuate-based *leaves permanently pubescent* with sordid or rufous hairs. — Que., N. B., and n. and w. N. E.

++ ++ *Leaves pale or white beneath; fruit mature in autumn.*

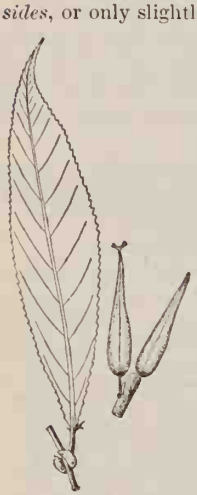
6. S. seríssima (Bailey) Fernald. (AUTUMN W.) *Leaves elliptic-lanceolate or oblong-lanceolate, short-acuminate,* in maturity coriaceous, 4–8 cm. long, 1–3 cm. broad, closely serrulate; *staminate aments* 1–1.5 *cm. long,* 1–1.2 cm. thick; the fertile becoming loosely flowered, 2–3.5 cm. long; *the olive- or brown-tinged* finally lustrous *indurated capsule conic-subulate,* 7–10 *mm. long,* the *pedicel twice exceeding the gland;* tall shrub. — Mossy swamps, mostly in calcareous regions, e. Que. to Alb., s. to w. Ct., n. N. J., w. N. Y., and the Great Lakes. Fig. 645.

645. S. serissima.

* * *Stamens* 2.

+ *Leaves lanceolate or ovate-lanceolate, long-acuminate, closely serrate.*

7. S. FRÁGILIS L. (CRACK W.) *Leaves glabrous from the first, green both sides,* or only slightly paler beneath, in maturity 1–1.5 dm. long, 2.5–4 cm. broad, *rather coarsely undulate-serrate, with about* 5 (4–7) *teeth to each cm. of the margin;* stipules when present half-cordate; aments slender; the staminate 3–5 cm. long; the fertile becoming 5–7 cm. long; *capsule subulate-conical,* 5 mm. long, short-pediceled. — A large tree, early planted, and now established, Que. to Ky. — Freely hybridizing with *S. alba.* (Nat. from Eu.) Fig. 646.


646. S. fragilis.

8. S. ÁLBA L. (WHITE W.) *Leaves pale with silky pubescence on both sides,* in maturity 5–12 cm. long, 1–3 cm. broad, *finely serrulate, with about* 9 (6–12) *teeth to each cm. of margin;* stipules ovate-lanceolate, deciduous; *capsule ovoid-conical,* 3–5 mm. long, sessile or nearly so. — The typical tree, with *greenish branchlets and leaves permanently silky,* is sometimes planted and rarely established in Am. Fig. 647. Var. VITELLÌNA (L.) Koch, with *yellow or reddish branchlets* and the *old leaves glabrous, white beneath,* is a familiar large tree of rapid growth, commonly planted and freely spreading. Var. CAERÙLEA (Sm.) Koch is similar, but with *olive-green branchlets* and *bluish-green leaves.* — Hybridizes with *S. fragilis, S. lucida,* etc. (Nat. from Eu.)

647. S. alba.

9. S. BABYLÓNICA L. (WEEPING W.) *Leaves* at first silky, quickly glabrate, *pale beneath, in maturity* 6–12 cm. long, 0.5–1.5 *cm. broad, very slender-attenuate, sharply toothed; aments* 1.5–2 *cm. long;* the *sessile plump capsules* 1–1.5 *mm. long.* — Planted for ornament, and locally spread along river-banks and lake-shores, particularly from Ct. westw. and southw. (Nat. from Eu.) Fig. 648.

648. S. babylonica.

- ← *Leaves linear- or oblong-lanceolate, short-acuminate, remotely denticulate with projecting teeth.*

649. S. longifolia.

10. S. longifòlia Muhl. (SAND BAR W.) *Leaves* 3–15 cm. long, 4–15 mm. broad, *tapering at each end, nearly sessile*, more or less silky when young, at length smooth and green both sides, *with* 2–3 *teeth to each cm. of margin;* stipules small, lanceolate, deciduous; aments slender-cylindric, often clustered at the ends of the branchlets; capsule short-pediceled, blunt; stigmas large, sessile. (*S. fluviatilis* auth., not Nutt.; *S. interior* Rowlee.) — A shrub or small tree, spreading extensively in alluvial deposits and forming dense clumps, e. Que. to Man., s. to Del. and La.; common and characteristic inland. FIG. 649.

§ 2. *Aments lateral or terminal, with or without bracts; scales persistent, colored at the tip; stamens* 2 (*usually* 1 *in no.* 17).

* *Filaments glabrous and distinct.*

← *Capsules glabrous.*

↔ *Erect or ascending shrubs or small trees.*

= *Leaves lanceolate to ovate, acute or acuminate, serrate; sterile aments very silky, with a few bracts at base, becoming* 2–4 *cm. long, the fertile in fruit* 2.5–10 *cm. long.*

a. Leaves glabrous or quickly glabrate; capsules distinctly pediceled.

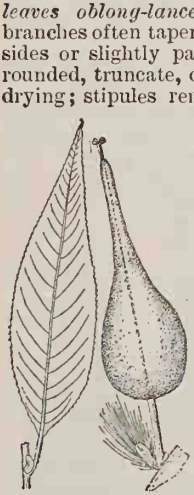
1. *Stipules persistent, usually conspicuous.*

O *Leaves dull above, the young pubescent with early-deciduous soft hairs.*

+ *Fruiting aments* 2.5–6 *cm. long; mature capsule* 4–7 *mm. long.*

11. S. cordàta Muhl. Twigs glabrous or soon glabrate; *leaves oblong-lanceolate or narrower*, on the flowering branches often tapering at base, sharply serrulate, green both sides or slightly paler beneath, on vigorous shoots mostly rounded, truncate, or cordate at base, not turning black in drying; stipules reniform or ovate, serrate, usually large; *aments rather slender;* capsules greenish or rufescent. — In wet places, along streams, etc.; a widely distributed shrub, freely hybridizing. FIG. 650. Var. MYRICOÌDES (Muhl.) Carey. Twigs cinereous or canescent with permanent pubescence; leaves elongate, even those of the most vigorous shoots tapering and rather acute at base, glaucous or glaucescent beneath and sparsely appressed-hairy; stipules small, ovate, pointed; capsules often silky when young, becoming glabrate, short-pediceled; twigs brittle at base. — Mass. to Wisc. and Kan. — Perhaps a hybrid with *S. sericea.*

650. S. cordata.



651. S. missouriensis.

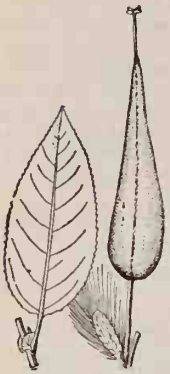
+ + *Fruiting aments* 6–10 *cm. long; mature capsules* 8–10 *mm. long.*

12. S. missouriénsis Bebb. Tree or large shrub (3–16 m. high), with black bark and permanently pubescent twigs; leaves lanceolate to ovate-oblong, rarely obovate, glaucous beneath. — Mo. to Neb. and I. T. — A poorly understood tree, said to flower earlier than *S. cordata;* perhaps a variety (var. *vestita* Anders.) of that species. FIG. 651.

O O *Leaves glossy above, glabrous from the first.*

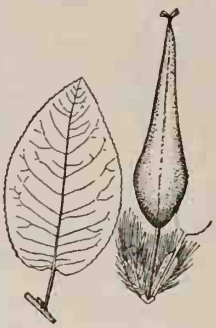
13. S. glaucophýlla Bebb. *Leaves* from ovate or obovate to oblong-lanceo-

late, with a broadly rounded base, 4.5–12 cm. long, 2–4.5 cm. wide, short-acuminate, glandular-serrate, *subcoriaceous, glabrous throughout, dark green and shining above, glaucous beneath*, the young drying black; stipules large, ear-shaped, dentate; *aments dense, thick-cylindrical*, very silky, the staminate 3.5–5 cm. long, the pistillate becoming 4–7 cm. long; capsules attenuate-rostrate, 9–11 mm. long, greenish, drying brown. — Shrub or shrubby tree (1–5 m. high), forming extensive thickets on sandy or alluvial shores of rivers and lakes, e. Que. to Alb., s. to N. B., Me., and the Great Lakes. Fig. 652. Var. ANGUSTIFÒLIA Bebb. Leaves narrower (8 cm. long, 2 cm. wide), pointed at both ends. — Same range. Var. BREVIFÒLIA Bebb. Leaves obovate or oblong, 2.5–3.5 cm. long, strongly veined. — Mich.


652. S. glaucophylla.

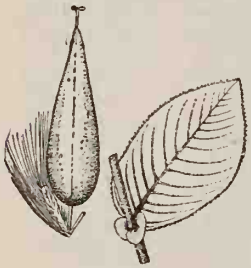
2. *Stipules obsolete or minute.*

14. **S. balsamífera** Barratt. *Leaves* short-oval to oblong-lanceolate, broadly rounded and usually subcordate at base, *at first very thin, subpellucid* and of a reddish color, balsamic-fragrant, *at length firm but thin, dark green above, paler or glaucous and prominently reticulate-veined beneath*, slightly glandular-serrulate; petioles long and slender; *fertile aments becoming very lax in fruit*, the long slender pedicels 6–8 times the length of the gland; style short. — Low woods and thickets, Nfd. and Lab. to Mackenzie and B. C., s. to n. N. E., N. Y., Mich., and Minn. — A much-branched shrub, rarely a tree 7 m. high, with shining reddish-castaneous or olive twigs. Fig. 653.


653. S. balsamifera.

b. Leaves clothed, even when fully grown, with a long silky tomentum on both sides, which is finally deciduous; capsule subsessile.

15. **S. syrtícola** Fernald. Leaves ovate or very broadly lanceolate, cuspidate-acuminate, dull green both sides, very closely serrate with fine projecting gland-tipped teeth; stipules conspicuous, ovate-cordate, glandular-serrate, exceeding the short stout petioles, which are dilated at base and embrace the obtuse silky buds; aments leafy-peduncled, the fertile not rarely becoming 1 dm. long, densely flowered. (*S. adenophylla* Am. auth., not Hook.) — Shores of the Great Lakes. — A large straggling shrub, with stout tomentose twigs and crowded leaves. Fig. 654.


654. S. syrticola.

= = *Leaves oblong-linear to elliptic-obovate, entire; sterile aments sparingly pubescent or glabrate, 1–2 cm. long, the fertile in fruit 1–3 cm. long; stigmas sessile or nearly so.*

16. **S. pedicellàris** Pursh. Leaves 1.5–7 cm. long, obtuse or somewhat pointed, acutish at base, smooth on both sides, somewhat coriaceous when mature, revolute, reticulated, pale or glaucous beneath; fertile aments thick-cylindric, loosely few-flowered, borne on long leafy peduncles; capsules reddish-green; pedicels slender, twice the length of the nearly smooth greenish-yellow scale. (*S. myrtilloides* Man. ed. 6, not L.) — Cold bogs and wet meadows, e. Que. to B. C., N. J., Pa., and n. Ia. Fig. 655.

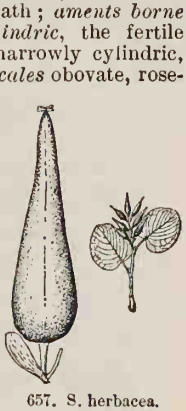
655. S. pedicellaris.

↔ ↔ *Prostrate or creeping and matted alpine shrubs.*

17. S. Ùva-úrsi Pursh. *Leaves elliptical* and pointed, or obovate and obtuse, 0.5–2.5 cm. long, tapering at base, slightly toothed, strongly veined, smooth and shining above, pale and rather glaucous beneath; *aments borne on slender lateral leafy peduncles, thick-cylindric*, the fertile lengthening to 2 or 3 cm. and becoming narrowly cylindric, *densely flowered* above, often loose below; *scales* obovate, rose-red at the tip, *covered with long silky hairs;* stamen 1 (rarely 2); capsule ovoid-conical, brownish at maturity; pedicel scarcely exceeding the gland; style distinct. — Lab. to Alaska, s. to alpine summits of n. N. E. and N. Y. — Closely prostrate, spreading from a stout central root over an area 3–9 dm. broad. Fig. 656.

656. S. Uva-ursi.

18. S. herbàcea L. *Leaves roundish oval*, heart-shaped, obtuse or retuse, 1–3 cm. long, serrate, smooth and shining, reticulately veined; *aments terminating 2-leaved branchlets, small, ovoid, 4–10-flowered; scales* concave, obovate, obtuse, *glabrous* or slightly pubescent; capsule subsessile. — Arctic Am., s. to alpine regions of Mt. Katahdin, Me., and Mt. Washington, N. H. — A very small herb-like species, the half-underground stems creeping and rooting in moss or humus, the branches seldom rising 0.5 dm. from the ground. (Eu.) Fig. 657.



657. S. herbacea.

← ← *Capsule pubescent.*

↔ *Fruiting pedicel 3–6 times the length of the gland; style short or none (elongate in no. 25).*

= *Mature leaves glabrous or glabrate beneath, or at most with a few scattered hairs. (Extreme forms of* S. rostrata *may be looked for here.)*

a. Aments sessile on the old wood, naked at base, appearing before the leaves; scales dark red, brown, or blackish; mature capsule 7–12 mm. long.

19. S. díscolor Muhl. (Glaucous W.) *Leaves lanceolate to elliptic, smooth and bright green above, soon smooth and glaucous beneath*, irregularly crenate-serrate, the serratures remote at base, closer, finer and becoming obsolete toward the point; stipules 1 cm. or more long and sharply toothed, or small and nearly entire; *aments thick, cylindrical, 2.5–7 cm. long, appearing in earliest spring; scales copiously clothed with long glossy hairs;* style short but distinct. Fig. 658. Var. eriocéphala (Michx.) Anders. Aments more densely flowered and more silvery-silky; leaves sometimes retaining a ferruginous pubescence beneath even when fully grown. (*S. eriocephala* Michx.) Var. prinoìdes (Pursh) Anders. Aments more loosely flowered, less silky; capsules more thinly tomentose; style longer; stigma-lobes laciniate; leaves narrower. (*S. prinoides* Pursh.) Includes narrow-leaved forms of the type, and others which are probably hybrids with *S. cordata*. — Large shrub or small tree of low meadows and river-banks, common. — The just expanding leaves are often overspread with evanescent ferruginous hairs.

658. S. discolor.

b. Aments short-stalked, leafy-bracted at base, appearing with the leaves; scales pale brown or yellowish; mature capsule 4–6 mm. long.

20. S. petiolàris Sm. Leaves narrowly lanceolate, taper-pointed, finely and evenly serrate, slightly silky when young, soon smooth; stipules linear or semicordate, deciduous; fertile

659. S. petiolaris

aments ovoid-cylindric, at first 1–2 cm. long, in fruit broad and loose from the lengthening of the pedicels, becoming 2–4 cm. long; capsule rostrate from an ovoid base, blunt. — Low shrub of damp soil, N. B. to the Great Lake region and Man., s. to Tenn. Fig. 659.

= = *Mature leaves pubescent at least beneath.*

a. Aments sessile on the old wood, naked at base, appearing before the leaves.

1. *Leaves dull, grayish-tomentose, undulate-crenate or subentire; capsules slender-beaked.*

21. S. hùmilis Marsh. (Prairie W.) *Leaves oblanceolate or oblong-lanceolate*, rarely obovate, 5–15 cm. long, above downy becoming glabrate, beneath glaucous, rugose-veined and softly tomentose, the margin revolute, undulate-entire; *stipules medium-sized*, semi-ovate, entire or oftener toothed; *petioles distinct;* aments ovoid or ellipsoid, often recurved, 1.5–4 cm. long. — Dry plains and barrens, Nfd. to Minn. and N. C. — A shrub, 1–3 m. high, varying much in the size and shape of the leaves. Fig. 660.

660. S. humilis.

Var. rigidiúscula Anders. Leaves narrowly oblanceolate to lance-oblong, 0.5–1 dm. long, rigid, strongly ascending, very rugose and glabrescent beneath. — O. to Ga. and Kan. — Shrub or small tree.

22. S. trístis Ait. (Dwarf Gray W.) *Leaves* similar to those of the last, *small* (1–5 cm. long), *crowded, linear-oblanceolate*, tapering to a *very short petiole; stipules minute, deciduous;* aments very small, globular or ovoid, 1–1.5 cm. long in fruit. — Sandy plains or on the borders of hillside thickets, N. E. to Minn. and southw., mostly near the coast. — A tufted shrub, 0.5 m. high. Fig. 661.

661. S. tristis.

2. *Leaves lustrous beneath with minute silky pubescence, fine-serrate; capsules blunt.*

23. S. serícea Marsh. (Silky W.) Leaves narrowly lanceolate, 0.4–1 dm. long, 1–2.5 cm. broad, finely serrate, at first (principally beneath) very silky, turning black in drying; stipules narrow, deciduous; aments narrowly cylindrical, the fertile densely flowered, in maturity 2–3 cm. long; capsule sericeous, ovoid-oblong, round-tipped, its pedicel about equaling the short-hairy scale and twice exceeding the gland. — Large shrub of wet places, N. B. to N. C. and Mich. Fig. 662.

662. S. sericea.

b. Aments leafy-bracted at base, appearing with the leaves.

1. *Leaves strongly rugose in age, grayish-pubescent or glabrate beneath; capsule gray-pubescent, its pedicel several times exceeding the subtending scale.*

24. S. rostràta Richards. *Leaves* obovate to elliptic-lanceolate, 3–10 cm. long, acute or acuminate, *dull green and minutely downy above*, serrate, crenate, or subentire, *thin, becoming rigid;* stipules when present semi-cordate, toothed, acute; sterile aments narrowed at base, the *fertile loosely flowered*, 2–6 cm. long; capsules tapering to a very long slender beak; *pedicels thread-like, much exceeding the pale rose-tipped linear thinly villous scales;* style scarcely any; stigma lobes entire or deeply parted. (*S. Bebbiana* Sarg.) — Shrub or small tree of moist or dry ground, Nfd. to Alaska, s. to N. J., Pa., Ill., Ia., etc. Fig. 663.

663. S. rostrata.

2. *Leaves scarcely rugose, lustrous-white beneath; capsule white-pubescent, its pedicel scarcely exceeding the subtending scale.*

25. **S. argyrocárpa** Anders. *Leaves* 2.5–5 *cm. long, repand-crenate, tapering evenly to both ends*, acute, or the earliest obovate and obtuse, at length rigid, the margin slightly revolute; petiole short; *stipules minute, fugaceous; fruiting ament short* (1.5–2.5 *cm. long*), lax; *capsule* tapering, densely *silky-silvery*, style elongate; gland of the staminate flower variously doubled. — Moist ravines and alpine slopes, Lab. to the highest mts. of Que., Me., and N. H. — A bushy-branched shrub, erect or depressed at base, rarely 0.5 m. high. Fig. 664. — Hybridizes with *S. phylicifolia*.

664. S. argyrocarpa.

26. **S. coáctilis** Fernald. *Leaves* oblong or lance-ovate, *long-acuminate, at first reddish-white beneath* with lustrous *felt-like pubescence*, later velvety with distinct hairs, *in maturity* 6–18 *cm. long*, 2–5 *cm. broad, remotely and coarsely glandular-dentate; stipules* semi-ovate, gland-toothed, 4–5 mm. long, *persistent; aments* in anthesis 2–3.5 cm. long, *in fruit* 4–5.5 *cm. long*, 7 *mm. thick;* scales oblong or obovate, dark brown or black, very long-hairy; *capsule conic-subulate*, 5 mm. long, *white-villous;* the pedicel about five times as long as the gland. — Banks of the Penobscot R., Me. — A large shrub with coarse dark branchlets the younger ones puberulent.

++ ++ *Fruiting pedicel at most twice the length of the gland.*

= *Leaves distinctly pubescent beneath.*

a. Pubescence of the leaves and branchlets a dull white flocculent tomentum.

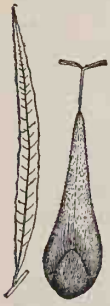
27. **S. cándida** Flügge. (Sage W., Hoary W.) Leaves oblong to linear-lanceolate, 4–12 cm. long, rather rigid, downy above, becoming glabrate, *beneath covered with a dense white tomentum*, the revolute margin subentire; *stipules lanceolate, about as long as the petioles;* aments cylindrical, densely flowered, 3–5 cm. long in fruit; anthers red; the dark gland elongated; capsule densely white-woolly; style dark red; stigmas short, spreading, notched. — Cold bogs, Nfd. and Lab. to Athabasca, s. to N. J., Pa., O., Ia., etc. — A hoary shrub, 0.5–2 m. high; young shoots white-woolly, the older red. Fig. 665. Var. denudàta Anders. Leaves dark green and glabrate above, sparingly pubescent or glabrate beneath. — Gaspé Co., Que. to Wisc. and Ct.

665. S. candida.

b. Pubescence of the leaves lustrous.

1. *Leaves pubescent beneath with minute satiny hairs.*

28. **S. viminàlis** L. (Osier.) Large shrub or small tree; branchlets greenish or pale brown; leaves lanceolate or linear-lanceolate, taper-pointed, green and glabrous above, 6–15 cm. long; aments sessile or subsessile on the old wood, the pistillate becoming 5–7 cm. long; capsule subsessile, minutely puberulent, 6–8 mm. long. — Cultivated and occasionally established. (Introd. from Eu.) Fig. 666.


666. S. viminalis.

2. *Leaves, at least when young, lustrous beneath with velvety pubescence.*

29. **S. pellita** Anders. Large shrub or small tree with dark reddish or olive branchlets; leaves lance-linear to oblanceolate, subentire, green and glabrous above, white-velvety to pale green and glabrate beneath, 4–12 cm. long; aments leafy-bracted at base, the fertile 2–5 cm. long; capsule 4–5 mm. long, densely white-hairy; style yellowish, turning brown. — River banks and swamps, Gulf of St. Lawrence to Lake St. John, Que., and Lake Winnipeg, s. to Me. and Vt. Fig. 667.

667. S. pellita.

= = *Leaves glabrous, or the youngest occasionally with arachnoid hairs.*

30. **S. phylicifòlia** L. Leaves elliptic-lanceolate to oblong, somewhat equally pointed or obtuse at both ends, remotely and minutely repand-toothed, 2.5–7 cm. long, *very smooth on both sides*, dark green and shining above, glaucous beneath, at length coriaceous; *stipules obsolete;* aments sessile with a few small bracts at base, 1.5–3 cm. long, rather densely flowered, short-cylindric, the fertile becoming in fruit somewhat stalked, 3.5–4.5 cm. long; scales dark, silky-villous; capsule conic-rostrate from an ovoid base; stigmas bifid or entire, yellow, drying black. (*S. chlorophylla* Anders.) — Lab. to Alaska, s. to alpine districts of Que., Me., N. H., and Vt. — A divaricately much branched shrub 0.5–3 m. high; twigs glabrous, purplish, sometimes covered with a glaucous bloom. (Eu.) Fig. 668.

668. S. phylicifolia. Leaf × ⅓ Fruit × 6

* * *Hairy filaments and often the reddish anthers united so as to appear as one.*

31. **S. purpùrea** L. (Purple W.) Leaves oblanceolate or tongue-shaped, slightly serrulate, very smooth, glaucescent, subopposite; stipules obsolete; aments densely flowered, narrow-cylindrical, the sterile at least closely sessile, with only very small bracts at base; scales small, round, crisp-villous, tipped with dark purple; capsules grayish-tomentose, ovoid-conical, obtuse, sessile, 2–3 mm. long. — Low grounds; originally cultivated for basket rods; now established. (Nat. from Eu.) Fig. 669.

669. S. purpurea.

2. PÓPULUS [Tourn.] L. Poplar. Aspen

Flowers from a cup-shaped disk which is obliquely lengthened in front. Stamens 8–30, or more; filaments distinct. Stigmas 2–4. Capsules 2–4-valved. — Trees, with broad and more or less heart-shaped or ovate toothed leaves, and often angular branches. Buds scaly, covered with resinous varnish. Catkins long and drooping, appearing before the leaves. (The classical Latin name, of uncertain origin.)

§ 1. *Styles* 2, *with* 2–3 *narrow or filiform lobes; capsules thin, slender-conical,* 2-*valved, small, on very short pedicels; scales silky; stamens* 6–20; *leaves ovate, on laterally flattened petioles; terminal buds small, slightly glutinous.*

1. **P. álba** L. (White P., Silver-leaved P., Abele.) The younger branches and the *under surface of the* rhombic-oval sinuate-toothed acute *leaves white tomentose;* scales crenate, fringed. — Frequently cultivated for shade, spreading widely by the root, and occasionally spontaneous. (Introd. from Eu.)

2. **P. tremuloìdes** Michx. (American A.) Tree 6–20 m. high, with smooth greenish-white bark; *bud-scales glabrous or merely ciliate; leaves roundish-heart-shaped*, with a short sharp point, and *small somewhat regular teeth*, smooth on both sides, with serrulate margins, downy when young, on long slender petioles; *scales cut into* 3–4 *deep linear divisions*, fringed with long hairs. — Light soils, Lab. to Alaska, s. to Pa., Mo., etc.

3. **P. grandidentàta** Michx. (Large-toothed A.) Tree often 20 m. high, with smoothish gray bark; *bud-scales tomentose; leaves roundish-ovate, with large and irregular sinuate teeth*, when young densely covered with white silky wool, at length smooth both sides; *scales cut into* 5–6 *unequal small divisions*, slightly fringed. — Rich woods and borders of streams, N. S. to the mts. of N. C., w. to Ont., Minn., and Ia.

§ 2. *Styles* 2–4, *with dilated lobes; capsules large, often thick, subglobose to ellipsoid,* 2–4-*valved; scales mostly glabrous; terminal buds large and very glutinous.*

* *Petioles terete or channeled, but little if at all laterally flattened.*

+ *Young leaves and petioles white-tomentose; capsule slender-pediceled.*

4. **P. heterophylla** L. (Downy P.) Tree 10–25 m. high; leaves ovate, with a somewhat truncate or cordate base, obtuse, crenate, at length nearly smooth, except on the elevated veins beneath; fertile catkins few-flowered; stamens 12–60; capsules 1–1.3 cm. long, equaling the pedicels. — Borders of river swamps, Ct. to Ga.; also from O. to Ark. and La.

+ + *Young leaves and petioles not white-tomentose; capsule stout-pediceled.*

5. **P. balsamífera** L. (Balsam P., Tacamahac.) Tree 6–30 m. high, the large buds varnished with a copious fragrant resin; *leaves ovate-lanceolate to cordate-ovate, gradually tapering and pointed*, finely crenate, smooth on both sides, silvery and reticulately veined beneath; scales dilated, slightly hairy; *stamens* 20–30; *capsule ovoid*, 2-*valved*. — Borders of rivers and swamps, Lab. to Alaska, s. to n. and w. N. E., Mich., Minn., etc.

6. **P. cándicans** Ait. (Balm of Gilead.) Leaves broader and more or less heart-shaped, *petiole and lower surface hairy*. (*P. balsamifera*, var. Gray.) — Common in cultivation and freely escaping; perhaps of Asiatic origin. (Introd.)

* * *Petioles laterally flattened.*

7. **P. deltoìdes** Marsh. (Cotton-wood, Necklace P.) Tree 15–30 m. high; *leaves broadly deltoid*, with numerous crenate serratures and narrow very acute acumination, sometimes ovate, rarely cordate, on elongated petioles; scales lacerate-fringed, not hairy; *stamens* 60 *or more; capsules* on slender pedicels, 6–10 mm. long, in long catkins, *ellipsoid-ovoid*, 3–4-*valved*. (*P. monilifera* Ait.) — Borders of streams, w. Que. and N. H. to Fla., w. to the Rocky Mts.

P. nìgra L., the Black P. of Eu., a pyramidal tree somewhat resembling the preceding but with the less lustrous rhombic-deltoid smaller leaves broader than long, more finely crenate, and its var. itálica Du Roi, the Lombardy P., with strictly ascending branches, are spreading from cultivation. (Introd. from Eu.)

MYRICÀCEAE (Sweet Gale Family)

Monoecious or dioecious shrubs, with each kind of flowers in short scaly catkins, and resinous-dotted often fragrant leaves, — differing from the Birches chiefly in the 1-celled ovary with a single erect orthotropus ovule, and the drupe-like nut. Involucre and perianth none.

1. MYRÌCA L.

The only genus. — Flowers solitary under a scale-like bract and with a pair of bractlets, the sterile in ellipsoid or cylindrical, the fertile in ovoid or globular catkins, from axillary scaly buds; stamens 2–8; filaments somewhat united below; anthers 2-celled. Fruit small, globular or short-cylindric, dry, coated with resinous grains or wax. (Μυρίκη, the ancient name of the Tamarisk or some other shrub; perhaps from μυρίζειν, to perfume.)

* *Mostly dioecious; fertile catkins ovoid; ovary with 2–4 scales at base; nut globular; leaves entire or somewhat serrate.*

1. **M. Gàle** L. (Sweet Gale.) Shrub 1–1.5 m. high; *leaves wedge-lanceolate*, serrate toward the apex, *pale, later than the flowers; sterile catkins closely clustered;* nuts imbricated in heads, 2-winged by the two thick ovate scales which coalesce with its base. — Borders of ponds, and in swamps, Lab. to N. E., along the Great Lakes to Minn., and northwestw.; s. in the mts. to Va. April, May. (Eurasia.)

2. **M. cerífera** L. (Wax Myrtle.) *Leaves* (1–1.6 *cm. broad*) *lanceolate*, narrowed at the base, entire or sharply toothed toward the *acute apex, shining and resinous-dotted both sides, somewhat preceding the flowers, fragrant; sterile*

catkins scattered, oblong; scales wedge-shaped at the base; *nuts* scattered and naked, bony, 2.5–3 *mm. in diameter*, and incrusted with white wax. — Sandy soil, Md. to Fla., Tex., and Ark. March, Apr.

3. **M. carolinénsis** Mill. (Bayberry.) Shrub 1–2 m. high; *leaves oblong*, entire or somewhat crenately toothed, thinner and more flaccid than in the preceding, *mostly obtuse*, 1.5–4 *cm. broad*, green and resinous-dotted on both sides; *fruit* 3.5–4 *mm. in diameter*. (*M. cerifera* Man. ed. 6, in great part.) — Sandy or sterile soil, chiefly near the coast, P. E. I. and N. B. to Fla. and La.; also on L. Erie.

** *Frequently monoecious; fertile catkins globular; ovary surrounded by* 8 *long narrowly awl-shaped persistent scales; nut ovoid-subcylindric; leaves pinnatifid with many rounded lobes.*

4. **M. asplenifòlia** L. (Sweet Fern.) Shrub 3–6 dm. high, with sweet-scented fern-like linear-lanceolate leaves; stipules half heart-shaped; scales of the sterile catkins kidney-heart-shaped, pointed. (*Comptonia* Ait.; *C. peregrina* Coult.) — Sterile soil, N. B. and N. S. to N. C., Ind., and the Saskatchewan. Apr., May.

LEITNERIÀCEAE (Cork Wood Family)

Dioecious shrubs or small trees, with each kind of flowers in catkins opening before the leaves; the sterile catkins many- the fertile few-flowered; calyx and corolla none; stamens 3–12, *whorled, the filaments short, distinct, hypogynous; ovary* 1-*celled with solitary ascending amphitropous ovule and thickish terminal style with lateral groove.* Leaves simple, entire, alternate; stipules obsolete or none. Flowers solitary in the axils of ovate pubescent scales, sessile. Fruit an obovoid somewhat compressed leathery drupe.

1. LEITNÈRIA Chapm.

Characters of the family. (Named in memory of *Dr. E. T. Leitner*, a German naturalist who traveled and was killed in Florida.)

1. **L. floridàna** Chapm. (Cork Wood.) Stout arborescent shrub 1–7 m. high; leaves oblong or obovate, somewhat canescent-tomentose on the lower surface; sterile catkins about 3 cm. long, the fertile half as long; drupe 1–2 cm. long. — Swamps, s. Mo. and southwestw.; also Fla. March.

JUGLANDÀCEAE (Walnut Family)

Trees, with alternate pinnate leaves, and no stipules; flowers monoecious, the sterile in catkins (aments) with an irregular calyx adnate to the bract; the fertile solitary or in a small cluster or spike, with a regular 3–5-*lobed calyx adherent to the incompletely* 2–4-*celled but only* 1-*ovuled ovary. Fruit a kind of dry drupe, with a crustaceous or bony nutshell, containing a large* 4-*lobed orthotropous seed.* Albumen none. Cotyledons fleshy and oily, sinuous or corrugated, 2-lobed; radicle short, superior. Petals sometimes present in the fertile flowers. — A small family of important trees, consisting chiefly of the two following genera.

1. JÙGLANS L. Walnut

Stamens 12–40; filaments free, very short. Fertile flowers solitary or several together on a peduncle at the end of the branch, with a 4-toothed calyx, bearing 4 small petals at the sinuses. Styles 2, very short; stigmas 2, somewhat club-shaped and fringed. Fruit with a fibrous-fleshy indehiscent epicarp, and a mostly rough irregularly furrowed endocarp or nutshell. — Trees, with odd-

pinnate leaves of many serrate leaflets. Pith in plates. (Name contracted from *Jovis glans*, the nut of Jupiter.)

1. **J. cinèrea** L. (BUTTERNUT, WHITE W.) Leaflets 7–17, oblong-lanceolate, pointed, rounded at base, downy especially beneath, the *petioles and branchlets downy with clammy hairs; fruit ellipsoid, clammy*, pointed, the nut deeply sculptured and rough with ragged ridges, 2-celled at the base. — Rich woods, N. B. to the mts. of Ga., w. to Ont., "Dak.," e. Kan. and Ark. — Trunk 16–30 m. high, with gray bark, widely spreading branches, and lighter brown wood than in the next.

2. **J. nìgra** L. (BLACK W.) Leaflets 11–17 (–"23"), ovate-lanceolate, taper-pointed, somewhat heart-shaped or unequal at base, smooth above, the lower surface and the *petioles minutely downy; fruit spherical*, roughly dotted, the nut corrugated, 4-celled at top and bottom. — Rich woods, w. Mass. to Fla., w. to Ont., Minn., and Tex. — A large and handsome tree, with rough dark bark and valuable purplish-brown wood.

2. CÀRYA Nutt. HICKORY

Stamens 3–10; filaments short or none, free. Fertile flowers 2–5 in a cluster or short spike, on a peduncle terminating the shoot of the season; calyx 4-toothed; petals none. Stigmas sessile, 2 or 4, large, papillose, persistent. Fruit with a 4-valved firm and at length dry exocarp (involucre), falling away from the smooth and crustaceous or bony endocarp or nutshell, which is incompletely 2-celled, and at the base mostly 4-celled. — Fine timber-trees with hard and very tough wood, and scaly buds, from which in spring are put forth usually both kinds of flowers, the sterile below and the fertile above the leaves. Nuts ripen and fall in October. (Καρύα, an ancient name of the Walnut.) SCORIA Raf. (1808); HICORIUS Raf. (1817); HICORIA Raf. (1836).

§ 1. *Sterile catkins fascicled (no common peduncle or sometimes a very short one) from separate lateral scaly buds near the summit of shoots of the preceding year; bud-scales few; fruit elongated; the thin-shelled nut 2-celled below; seeds sweet; leaflets short-stalked, numerous.*

1. **C. illinoénsis** (Wang.) K. Koch. (PECAN.) Minutely downy, becoming nearly smooth; leaflets 9–17, oblong-lanceolate, tapering gradually to a slender point, falcate, serrate; nut olive-shaped. (*C. olivaeformis* Nutt.; *Hicoria Pecan* Britton.) — River bottoms, s. Ind. to Ia., e. Kan., Tex., and Ala. — A large tree (25–50 m. high), with delicious nuts.

§ 2. *Sterile catkins in threes (rarely more) on a common peduncle from the axil of an inner scale of the common bud, therefore at the base of the shoot of the season, which, then bearing 3 or 4 leaves, is terminated by the fertile flowers; fruit globular or ovoid; nut 4-celled at base; leaflets sessile or nearly so.*

* *Bud-scales numerous, about 10, successively inwrapping, the inner ones accrescent, becoming thin and membranaceous and rather tardily deciduous; husk of the fruit splitting promptly into 4 more or less thick and when dry hard or woody valves; seed sweet and delicious.* (The HICKORY NUTS of the market.)

2. **C. ovàta** (Mill.) K. Koch. (SHELL-BARK or SHAG-BARK H.) Bark of trunk shaggy, exfoliating in rough strips or plates; inner bud-scales becoming large and conspicuous, persistent till the flowers are fully developed; *leaflets* 5–7, when young minutely downy beneath, finely serrate, the three upper obovate-lanceolate, the *lower pair much smaller* and oblong-lanceolate, all taper-pointed; fruit globular or depressed; *nut white*, flattish-globular, barely mucronate, the shell thinnish. (*C. alba* Nutt.; *Hicoria ovata* Britton.) — N. E. and w. Que. to north shore of L. Huron, e. Minn., Tex., and Fla. — A large and handsome tree (20–28 m. high, or more), yielding the principal HICKORY NUT of the markets. *Hicoria carolinae-septentrionalis* Ashe appears to be merely a small-fruited extreme of this species.

3. **C. laciniòsa** (Michx. f.) Loud. (Big Shell-bark, King Nut.) Bark, etc., as in no. 2; *leaflets* 7–9, more downy beneath; *fruit ovoid*, 4-ribbed above the middle, the husk very thick; *nut large* (3–5 cm. long) and usually angular, *dull white or yellowish, thick-walled, usually strongly pointed at both ends.* (*C. sulcata* Nutt.; *Hicoria laciniosa* Sarg.) — Centr. N. Y. and Pa. to s. Ind., Ia., e. Kan., and I. T. — Trunk 20–30 m. high, or more, in rich soil of bottom lands.

4. **C. álba** (L.) K. Koch. (Mocker Nut, White-heart H.) *Bark close*, rough, but not shaggy nor exfoliating on old trunks; catkins, shoots, and lower surface of the leaves *tomentose* when young, resinous-scented; *leaflets* 7–9, lance-obovate or the lower oblong-lanceolate, pointed; *fruit globular or ovoid*, with a very thick and hard husk; *nut globular, not compressed, 4-ridged toward the slightly pointed summit, brownish*, very thick-shelled, 2.5 cm. in diameter or smaller. (*C. tomentosa* Nutt.; *Hicoria alba* Britton.) — E. Mass. to n. shore of L. Erie, e. Neb., and s. to the Gulf. — Tree 20–30 m. high, usually on rich upland hillsides. A species not to be confused with *C. alba* Nutt., which is now to be called *C. ovata.*

5. **C. microcárpa** Nutt. With rough close bark, small ovoid buds, and the glabrous foliage, etc., of no. 7; fruit small, subglobose, with rather thin husk; nut thin-shelled, not angled. (*Hicoria* Britton; *H. glabra*, var. *odorata* Sarg.; *H. borealis* Ashe?) — "Que." and e. Mass. to Del., Mich., and Mo.

* * *Bud-scales numerous or few; husk of the fruit thin and rather friable at maturity, 4-valved only to the middle or tardily to near the base; seed more or less bitter.*

← *Bark of trunk exfoliating in long strips.*

6. **C. aquática** (Michx. f.) Nutt. (Bitter Pecan.) Bud-scales few, subvalvate; *leaflets* 9–15, falcate-lanceolate, attenuate, serrate, of firm texture; *nut strongly compressed and sharply angled;* seed very bitter. (*Hicoria* Britton.) — River swamps, Va. to s. Ill., Mo., Tex., and Fla.

← ← *Bark not exfoliating.*

7. **C. glàbra** (Mill.) Spach. (Pignut or Broom H.) Bud-scales nearly as in no. 4, but smaller, caducous; shoots, catkins, and leaves *glabrous* or nearly so; *leaflets* 5–7, oblong- or obovate-lanceolate and taper-pointed, serrate; fruit pear-shaped to ovoid; *nut* (3–5 cm. long) *with thick bony shell;* the oily seed at first sweet in taste, then bitterish. (*C. porcina* Nutt.; *Hicoria glabra* Britton.) — Dry woodlands, s. Me. to Fla., w. to Ont., Minn., e. Neb., and Tex. — Tree 20–30 (rarely 37) m. high. Passing to

Var. **villòsa** (Sarg.) Robinson. Petioles, rhachises, and peduncles *sordid-villous;* the lower surface of the leaflets mostly paler, covered with broader and more numerous peltate scale-like glands. (*Hicoria glabra*, var. Sarg.; *H. villosa* and *H. pallida* Ashe.) — Va. to Mo. and southw.

8. **C. cordifórmis** (Wang.) K. Koch. (Bitter Nut or Swamp H.) Scales of the small yellowish buds about 6, valvate in pairs, caducous in leafing; catkins and young herbage more or less pubescent, soon becoming almost glabrous; *leaflets* 7–11, *lanceolate* or oblong-lanceolate; fruit turgid-ellipsoid, narrowly 6-ridged; *nut* turgid, smoothish, shallowly reticulate-sulcate, *globular, short-pointed*, white (barely 2.5 cm. long), *thin-walled*, with slender-conical beak and persistent expanded stigma; seed at first sweet-tasted, soon extremely bitter. (*C. amara* Nutt.; *Hicoria minima* Britton.) — Rich woods, w. Que. and N. E. to Fla., n. shore of L. Huron, Minn., e. Neb., and Tex. — Tree 15–30 m. high; husk and shell thinner and less hard than in other species. Koch, who first transferred *Juglans cordiformis* Wang. to *Carya*, confused other material with it, but the binomial technically rests on the plant of Wangenheim.

BETULÀCEAE (Birch Family)

Monoecious (rarely dioecious) trees or shrubs, with alternate simple straight-veined leaves and deciduous stipules; the sterile flowers in catkins, the fertile

clustered, spiked, or in scaly catkins; the 1-celled and 1-seeded nut with or without a foliaceous involucre. Ovary 2-celled, with 2 pendulous anatropous ovules in each cell; fruit seemingly 1-celled and 1-ovuled; styles 2. Seed with no albumen, filled with the embryo, and with 1 integument.

Tribe I. CORÝLEAE. Sterile catkins pendulous, with no calyx; stamens 3 or more to each bract and more or less adnate to it, the filaments often forked (anthers 1-celled). Fertile flowers in a short ament or head, 2 to each bract, and each with one or more bractlets which form a foliaceous involucre to the nut.

* Bract of staminate flower furnished with a pair of bractlets inside; fertile flowers few.

1. **Corylus.** Involucre leafy-coriaceous, inclosing the large acorn-like nut.

** Bract of staminate flower simple; fertile flowers in short catkins; nut small, achene-like.

2. **Ostrya.** Each ovary and nut included in a bladdery and closed bag.
3. **Carpinus.** Each nut subtended by an enlarged spreading leafy bractlet.

Tribe II. BETÙLEAE. Flowers in scaly catkins, 2 or 3 to each bract. Sterile catkins pendulous. Stamens 2–4, and calyx usually 2–4-parted. Fertile flowers with no calyx, and no involucre to the small compressed and often winged nut.

4. **Betula.** Stamens 2, bifid. Fertile scales thin, 3-lobed, deciduous with or soon after the nuts.
5. **Alnus.** Stamens 4. Fertile scales thick, becoming woody, long-persistent.

1. CÓRYLUS [Tourn.] L. Hazelnut. Filbert

Sterile flowers consisting of 8 (half-) stamens with 1-celled anthers, their short filaments and pair of scaly bractlets cohering more or less with the inner face of the scale of the catkin. Fertile flowers several from a scaly bud; ovary tipped with the short limb of the adherent calyx, one of the ovules sterile; style short; stigmas 2, red, elongated and slender. Nut ovoid or subglobose, inclosed in a leafy or partly coriaceous cup or involucre consisting of the two bractlets enlarged and often grown together and lacerated at the border. Cotyledons very thick (raised to the surface in germination), sweet and edible; the short radicle included. — Shrubs or small trees, with thinnish doubly-toothed leaves (folded lengthwise in the bud), flowering in early spring; sterile catkins single or fascicled from scaly buds of the axils of the preceding year, the fertile terminating early leafy shoots. (The classical name, probably from κόρυς, *a helmet*, from the involucre.)

1. **C. americàna** Walt. (Hazelnut.) *Twigs and petioles often glandular-bristly; leaves roundish-heart-shaped,* pointed; *involucre open above* down to the globose nut, *of 2 broad foliaceous cut-toothed almost distinct bracts,* their bases coriaceous and downy or with glandular bristles intermixed; pericarp bony. — Thickets, N. E. to Sask., and southw.

2. **C. rostràta** Ait. (Beaked H.) *Twigs and petioles not glandular-bristly; leaves ovate or ovate-oblong, somewhat heart-shaped,* pointed; *involucre of united bracts, much prolonged* above the ovoid nut *into a narrow tubular beak, densely bristly;* pericarp thinnish and membranaceous. — Que. to B. C., s. to Del., Mich., Mo., and westw.; also in the mts. to Ga.

2. ÓSTRYA [Mich.] Scop. Hop Hornbeam. Ironwood.

Sterile flowers consisting of several stamens in the axil of each bract; filaments short, often forked, bearing 1-celled (half-) anthers; their tips hairy. Fertile flowers a pair to each deciduous bract, each of an incompletely 2-celled 2-ovuled ovary, crowned with the short bearded border of the adherent calyx, tipped with 2 long-linear stigmas, and inclosed in a tubular bractlet, which in fruit becomes a closed bladdery ellipsoid bag, very much larger than the small smooth nut; these inflated involucres loosely imbricated to form a sort of strobile, in appearance like that of the Hop. — Slender trees, with very hard wood, brownish furrowed bark, and foliage resembling that of Birch; leaves open and concave in the bud, more or less plaited on the straight veins. Flowers appearing with the leaves; the sterile catkins 1–3 together from scaly buds at the tips

of the branches of the preceding year; the fertile single, terminating short leafy shoots of the season. (The classical name.)

1. O. virginiàna (Mill.) K. Koch. (American Hop H., Leverwood.) Leaves oblong-ovate, taper-pointed, very sharply double-serrate, downy beneath, with 11–15 principal veins; buds acute; involucral sacs bristly-hairy at the base. (*O. virginica* Willd.) — Rich woods, N. S. to Man., Minn., Neb., and southw.

3. CARPÌNUS [Tourn.] L. Hornbeam. Ironwood

Sterile flowers similar to those of *Ostrya*. Fertile flowers several, spiked in a sort of loose terminal catkin, with small deciduous bracts, each subtending a pair of flowers; the single involucre-like bract open, enlarged in fruit and foliaceous, merely subtending the small ovate several-nerved nut. — Trees or tall shrubs, with close gray bark, in this and in the slender buds and straight-veined leaves resembling the Beech; leaf-buds and inflorescence as in *Ostrya*. (The early Latin name.)

1. C. caroliniàna Walt. (American H.; Blue or Water Beech.) Leaves ovate-oblong, pointed, sharply double-serrate, soon nearly smooth; bractlets 3-lobed, halberd-shaped, sparingly cut-toothed on one side, acute. — Along streams. N. S. to w Ont., and southw.

4. BÉTULA [Tourn.] L. Birch

Sterile flowers 3 (the bractlets 2) to each shield-shaped scale or bract of the catkins, consisting each of a calyx of one scale bearing 4 short filaments with 1-celled anthers (or strictly of two 2-parted filaments, each division bearing an anther-cell). Fertile flowers 2 or 3 to each 3-lobed bract, without bractlets or calyx, each a naked ovary, becoming a winged and scale-like nutlet (or small samara) crowned with the two spreading stigmas. — Outer bark often separable in sheets, that of the branchlets dotted. Buds sessile, scaly. Sterile catkins terminal and lateral, sessile, formed in summer, remaining naked through winter, and expanding in early spring, with or preceding the leaves; fertile catkins ovoid to cylindrical, usually terminating very short 2-leaved early lateral branches of the season. (The ancient Latin name.)

* *Trees or shrubs; the leaves with the* 8 *or more pairs of nerves impressed above; fruiting catkins thick* (1 *cm. or more*), *short-cylindric to ovoid, their scales rather persistent; wing of fruit not broader than the seed-bearing body.*

← *Bark and twigs sweet-aromatic; leaves membranaceous, ovate to oblong-ovate, with rounded or cordate bases, regularly serrate, green both sides; fertile catkins sessile, erect.*

1. B. lénta L. (Cherry, Sweet, or Black B.) *Bark* of trunk *dark brown, close*, in age becoming ashy-brown and furrowed, very sweet-aromatic; leaves ovate or ovate-oblong from a more or less heart-shaped base, acuminate, sharply and finely double-serrate, when mature bright green above and glabrous except on the veins beneath; *fruiting catkins short-cylindric* (1.5–2.5 cm. long); the *scales firm and smooth*, with short and *divergent lobes*. — Rich woods, Nfd. to Ont., s. to Del., Ind. and centr. Ia.; also along the mts. to Fla. and Tenn.

2. B. lùtea Michx. f. (Yellow or Gray B.) *Bark* of trunk *yellowish- or silvery-gray, detaching in very thin filmy layers*, less aromatic; leaves slightly or not at all heart-shaped and often narrowed toward the base, duller green above and usually more downy on the veins beneath; *fruiting catkins narrow-ovoid to subglobose*, the more *foliaceous scales* mostly longer, *pubescent* and with narrower *barely spreading ciliate lobes*. — Rich moist woods, Nfd. to Man., s. to Del., Ill., and Minn.; also along the mts. to Tenn. and N. C. — Trees with characteristics somewhat intermediate between this and *B. lenta* have been called *B. alleghaniensis* Britton.

← ← *Bark not aromatic; leaves firm, rhombic-ovate, cuneate to subtruncate at base, irregularly dentate-serrate, whitish beneath; fertile catkins peduncled, soft-downy.*

3. **B. nigra** L. (River or Red B.) Tree with greenish-brown somewhat aminate bark and reddish twigs; leaves acutish at both ends, when young lowny underneath; petioles, peduncles, and thick-cylindric catkins tomentose; bracts with oblong-linear nearly equal lobes. — Banks of streams and in swamps e. of the Alleghenies from e. Mass. to Fla., thence w. to Tex.; and through the bottom-lands of the Mississippi R. system.

* * *Trees or shrubs with slender cylindric fruiting catkins, their scales readily deciduous; leaves (of the fruiting branches) with 7 or less pairs of prominent veins.*

– *Wing distinctly broader than the body of the fruit; trees or stout shrubs with white, whitish, or brown papery bark.*

↔ *Bark dull, chalky- or ashy-white, smooth and close, the layers not readily exfoliating; staminate catkin usually solitary.*

4. **B. populifòlia** Marsh. (White, Gray or Old Field B.) Trunk usually ascending, rarely 10 m. high; *leaves triangular* (deltoid), *very taper-pointed* (usually abruptly), truncate or nearly so at the broad base, *smooth and shining both sides*, except for the resinous glands when young, tremulous on very slender petioles; fruiting catkins slender-stalked, ascending, 1–3 cm. long, 5-7 mm. thick; the *drab or ashy-brown wide-spreading scales* 2.5–4 mm. long, their *lobes puberulent.* — Poor sandy or rocky soil, commonest near the coast, P. E. I. to Del., w. to L. Ont.

↔ ↔ *Bark lustrous, creamy- or pinkish-white to bronze, freely splitting into paper-like layers; staminate catkins mostly* 2 *or* 3.

= *Branchlets and leaves strictly glabrous from the first.*

5. **B. péndula** Roth. (White or Canoe B.) Branches slender and flexuous, often drooping, the branchlets usually verrucose with resiniferous atoms; leaves glutinous when young, firm, rhombic-ovate to deltoid or broad-ovate, subcuneate, truncate, or subcordate at base, long-acuminate, slender-petioled; fertile catkins pendulous, 1.5–3 cm. long, 6–9 mm. thick; the *ascending brown or straw-colored scales* 3–5 mm. long, *glabrous except for the ciliate margin.* (*B. verrucosa* Ehrh.) — Rocky upland woods and slopes, Que. to Alaska, locally s. to Me., Vt., Ill., Man., etc. (Eurasia.) — A polymorphous boreal species, of which the N. E. phase has recently been designated as *B. caerulea* Blanchard (Blue B.).

= = *Branchlets puberulent or pubescent; young leaves* (except in var. *minor*) *pubescent beneath.*

6. **B. álba** L. (Paper, Canoe or White B.) Branches and branchlets ascending; resiniferous atoms, if present, mixed with long hairs; *leaves* ovate, taper-pointed, *from rounded to cuneate at base, in maturity* 3–6 *cm. long*, smooth and green above, pale, glandular-dotted, and *a little hairy on the veins beneath*, sharply and unequally double-serrate; fruiting catkins 1.5–4.5 cm. long, 0.5–1.5 cm. thick, spreading or drooping on slender peduncles; the mostly ciliate-margined ascending scales 3-7 mm. long. (*B. pubescens* Ehrh.) — Large shrub or medium-sized tree, Nfd. to B. C., s. to N. E., the Great Lake region, etc. (Eurasia.) Passing to the commoner American

Var. **papyrífera** (Marsh.) Spach. Usually a larger tree, with *mature leaves* 6–9 *cm. long.* (*B. papyrifera* Marsh.) — Nfd. to Alaska, s. to Pa., Ind., n. Ia., Neb., Wyo., and Wash.

Var. **glutinòsa** (Wallr.) Trautvetter. *Branches pendulous;* leaves 3–5 cm. long, pilose on the veins beneath; *catkins on straight peduncles.* — Wassataquoik Valley, Me. (Eu.)

Var. **cordifòlia** (Regel) Fernald. *Leaves* broad-ovate, *cordate*, pilose on the veins beneath. — Cool woods and mts., Lab. and Nfd. to B. C., s. to N. E., L. Superior, Ia., and westw. — Becoming a dwarf shrub on alpine slopes.

Var. **mìnor** (Tuckerm.) Fernald. Stout *dwarf shrub; leaves* elliptic- or truncate-ovate, *glutinous, glabrous*, 1.5–4 *cm. long;* staminate catkin often solitary; fruiting catkins mostly ascending, 1.3–3 cm. long, 0.5–1 cm. thick. (*B*

papyracea, var. Tuckerm.) — Alpine regions and cold bogs, Lab. to Sask., s. to n. N. E. and Minn. (Greenl.)

← ← *Wings narrower than or rarely as broad as the body of the fruit, or wanting; shrubs with dark scarcely papery bark, subsessile or short-petioled thickish or coriaceous small leaves, and narrowly ovoid or cylindric mostly erect sessile or short-peduncled catkins.*

↔ *Young branchlets pubescent with long soft hairs.*

7. **B. pùmila** L. (Low or Swamp B.) Stems 0.5–3 m. high, erect or ascending, *not glandular;* young branches and lower face of young leaves mostly *soft-downy; leaves* obovate, orbicular, or reniform, 1–3.5 cm. long, *not resiniferous, pale beneath, veinlets on both faces finely reticulated;* fruiting catkins 0.7–3 cm. long, 5–9 mm. thick. — Bogs, Lab. and Nfd. to Ont., s. to n. N. J., O., Ind., Ill., and Minn. (Eurasia.)

Var. **glandulífera** Regel. *Young branchlets and leaves resiniferous or glandular-dotted.* — Ont. and Mich. to Minn. and Sask.

↔ ↔ *Young branchlets glabrous or at most minutely puberulent, conspicuously dotted with resinous wart-like glands.*

8. **B. glandulòsa** Michx. (Dwarf B.) Stems erect or depressed, 0.3–2 m. high, or when alpine procumbent; *leaves wedge-obovate*, 0.5–3 cm. long, *green and glabrous both sides*, slightly reticulated; fruiting catkins 0.5–2.5 cm. long, 3–7 mm. thick. — Arctic barrens, s. to mts. of N. B., Me., and N. H.; L. Superior, Minn., etc. (Asia.) Var. rotundifòlia (Spach) Regel. Very dwarf; *leaves orbicular or reniform.* — Arctic regions to mts. of Me. and N. H. (Alaska; Asia.)

5. ÁLNUS [Tourn.] Hill. Alder

Sterile catkins with 4 or 5 bractlets and 3 (rarely 6) flowers upon each short-stalked shield-shaped scale; each flower usually with a 3–5-parted calyx and as many stamens; filaments short and simple; anthers 2-celled. Fertile catkins ovoid or ellipsoid; the fleshy scales each subtending 2 flowers and a group of 4 little scalelets adherent to the scales or bracts of the catkin, which are woody in fruit, wedge-obovate, truncate, or 3–5-lobed. — Shrubs or small trees with few-scaled leaf-buds and solitary or often racemose-clustered catkins. (The ancient Latin name.)

* *Flowers developed with the leaves; the sterile catkins from naked buds formed the preceding season; the fertile from scale-covered buds; fruit with a conspicuous thin wing.*

1. **A. crispa** (Ait.) Pursh. (Green or Mountain A.) Shrub with *young branches and peduncles sparingly puberulent or glabrate; leaves* round-oval, ovate or slightly heart-shaped, *in maturity 3–6 cm. long*, glutinous and *smooth, or slightly pubescent on the principal veins beneath*, irregularly serrulate or biserrulate with very fine and sharp closely set teeth, the margins often puckered; fertile catkins slender-stalked, loosely racemose, in maturity 1–1.5 cm. long. (*A. viridis* Man. ed. 6, in part, not DC.; *A. Alnobetula* Am. auth., in part, not K. Koch.) — Cool shores and mts., Lab. to N. B.; Mt. Katahdin, Me.; Mt. Washington, N. H.; Whiteface Mt., N. Y.; and on the mts. to N. C.

2. **A. mòllis** Fernald. (Downy Green A.) Shrub or small tree; *young branches and peduncles permanently soft-pubescent; leaves permanently covered beneath with dense soft hairs*, in maturity 4.5–11 *cm. long;* mature fertile catkins 1.2–2 cm. long. (*A. viridis* Man. ed. 6, in part, not DC.; *A. Alnobetula* Am. auth., in part, not K. Koch.) — Damp thickets and exposed rocky banks, s. Nfd. to L. Winnipeg, s. to s. Me. and N. H., w. Mass., N. Y., and L. Superior. — Ordinarily distinct, but possibly an extreme variation of *A. crispa.*

* * *Flowers developed in earliest spring before the leaves; the catkins all from naked buds formed the preceding season; fruit wingless or with a narrow coriaceous margin.*

3. **A. incàna** (L.) Moench. (SPECKLED or HOARY A.) Shrub or small tree (rarely 6 m. high); *leaves broadly elliptical to ovate, mostly rounded at base*, sharply and *doubly serrate*, the *upper surface* dark green and *with impressed nerves*, the *lower* mostly *downy at least on the nerves* and ferruginous to glaucous; stipules lanceolate; fruit (samara) orbicular. — Swamps and borders of streams, Nfd. to Sask., s. to Pa., n. Ia., and Neb.; the common Alder along our northern borders. (Eurasia.)

4. **A. rugòsa** (Du Roi) Spreng. (SMOOTH A.) Shrub or small tree; *leaves obovate, acuté at base*, sharply and *almost regularly serrate* with minute teeth, thickish, green both sides, rarely impressed-nerved, *smooth or sparingly pubescent beneath;* stipules oval; fruit ovate. (*A. serrulata* Willd.) — Me. to Fla. and Tex., rarely inland to Minn.; mostly on the coastal plain northw., more general southw. — Many shrubs near the n. limits of this range appear intermediate between this and the last species.

5. **A. vulgàris** Hill. (BLACK A. of Europe.) Tree with dark green *flabellate-obovate or suborbicular coarsely dentate glutinous leaves.* — Escaped from cultivation and locally established, Nfd. to N. J. and Pa. (Introd. from Eu.)

* * * *Flowers in autumn (Sept.) from catkins of the season; the fertile mostly solitary in the axils of the leaves, ripening the fruit a year later; fruit wingless.*

6. **A. marítima** (Marsh.) Muhl. (SEA-SIDE A.) Glabrous; leaves oblong, ovate, or obovate, with a wedge-shaped base, slender-petioled, sharply serrulate, bright green, or rather rusty beneath; fruiting catkins large, ovoid or ellipsoid (1.5–2.5 cm. long). — Del. and Md., near the coast; also I. T. — A small tree.

FAGÀCEAE (BEECH FAMILY)

Monoecious trees or shrubs, with alternate simple straight-veined leaves, deciduous stipules, the sterile flowers in catkins or capitate clusters, the fertile solitary or slightly clustered, the 1-celled and 1-seeded nut inclosed (or partly inclosed) in a cupule consisting of more or less consolidated bracts, which become indurated. Ovary 3–7-celled; ovules 1 or 2 in each cell (only 1 ripening); styles 3. Seed with no albumen, filled by the embryo, and with 2 integuments.

* Sterile flowers in a small head on drooping peduncles.

1. **Fagus.** Cupule 2-flowered, 4-valved, containing 2 sharply triangular nuts.

* * Sterile flowers in slender catkins.

2. **Castanea.** Cupule 2–4-flowered, forming a prickly hard bur, 2–4-valved when ripe.
3. **Quercus.** Cupule 1-flowered, scaly and without valves; nut terete.

1. FÀGUS [Tourn.] L. BEECH

Sterile flowers with deciduous scale-like bracts; calyx bell-shaped, 5–7-cleft; stamens 8–16; filaments slender; anthers 2-celled. Fertile flowers usually in pairs at the apex of a short peduncle, invested by numerous awl-shaped bractlets, the inner coherent at base to form the 4-lobed involucre; calyx-lobes 6, awl-shaped; ovary 3-celled with two ovules in each cell; styles thread-like, stigmatic along the inner side. Nuts usually 2 in each urn-shaped and soft-prickly coriaceous involucre, which divides to below the middle into 4 valves. Cotyledons thick, folded and somewhat united, but rising and expanding in germination. — Trees with a close and smooth ash-gray bark, a light horizontal spray, and undivided strongly straight-veined leaves, which are open and convex in the tapering bud and plaited on the veins. Flowers appearing with the leaves, the yellowish staminate flowers from the lower, the pistillate from the upper axils of the leaves of the season. (The classical Latin name, from φαγεῖν, *to eat*, in allusion to the esculent nuts.)

1. **F. grandifòlia** Ehrh. Large tree; leaves oblong-ovate, mostly cuneate at base, taper-pointed, distinctly and often coarsely toothed, light green; petioles and midrib soon nearly naked; prickles of the grayish or yellowish fruit subulate-filiform, elongated, recurved or spreading. (*F. ferruginea* Ait.; *F. americana* Sweet.) — Rich uplands, N. B. to w. Ont., s. to Va., Mich. and Minn.

Var. **caroliniàna** (Loud.) Fernald & Rehder. Leaves ovate to short-obovate, darker green, mostly rounded or subcordate at base and often less coarsely toothed; prickles of the rufescent fruit short, subulate. — Coastal plain, N. J. to Fla. and Miss.; also from O. to Mo. and Tex.

2. CASTÀNEA [Tourn.] Hill. Chestnut

Sterile flowers interruptedly clustered in long and naked cylindrical catkins; calyx mostly 6-parted; stamens 8–20; filaments slender; anthers 2-celled. Fertile flowers usually 3 together in an ovoid scaly prickly involucre; calyx with a 6-lobed border crowning the 3–7-celled 6–14-ovuled ovary; abortive stamens 5–12; styles linear, exserted, as many as the cells of the ovary; stigmas small. Nuts coriaceous, inclosed usually 2–3 together or solitary in the involucre. Cotyledons very thick, somewhat plaited, cohering, remaining underground in germination. — Leaves strongly straight-veined, undivided. Flowers later than the leaves, cream-color; the catkins axillary near the ends of the branches, wholly sterile or the upper androgynous with the fertile flowers at the base. (The classical name, from that of a town in Thessaly.)

1. **C. dentàta** (Marsh.) Borkh. (Chestnut.) A large tree; *leaves oblong-lanceolate, pointed*, serrate with coarse pointed teeth, acute at base, when mature *smooth and green both sides; nuts* 2 or 3 (rarely even 7–9) in each involucre, *flattened* on one or both sides, very sweet. (*C. sativa*, var. *americana* Sarg.) — Rocky woods and hillsides, s. Me. to Ont., and southw.

2. **C. pùmila** (L.) Mill. (Chinquapin.) A spreading shrub or small tree; *leaves oblong, acute*, serrate with pointed teeth, *whitish-downy beneath;* involucres small, often spiked; the *ovoid* pointed *nut* scarcely half as large as the common chestnut, very sweet, solitary, *not flattened.* — Dry woods and thickets, N. J. to Ind., and southw.; introd. northw.

3. QUÉRCUS [Tourn.] L. Oak

Sterile flowers in naked catkins; bracts caducous; calyx 2–8-parted or -lobed; stamens 3–12; anthers 2-celled. Fertile flowers scattered or somewhat clustered, consisting of a nearly 3-celled and 6-ovuled ovary, with a 3-lobed stigma, inclosed by a scaly bud-like involucre which becomes an indurated cup (*cupule*) around the base of the rounded nut or acorn. Cotyledons remaining underground in germination; radicle very short, included. — Flowers greenish, yellowish, or reddish. Sterile catkins single or often several from the same lateral scaly bud, filiform and hanging in all our species. All the species inclined to hybridize freely. (The classical Latin name.)

§ 1. Bark pale, often scaly; leaves and their lobes or teeth obtuse (rarely with sharp teeth), never bristle-pointed; stamens 6–8; scales of the cup more or less woody and knobby at base; stigmas sessile or nearly so; abortive ovules at the base of the perfect seed; inner surface of shell of nut glabrous; fruit maturing the first year; kernel commonly sweetish. — Lepidobálanus Endl. *a.*

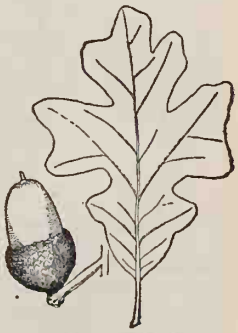
a. Leaves deciduous, sinuate-toothed or lobed *b.*
- *b.* Leaves lyrate or sinuate-pinnatifid *c.*
  - *c.* Mature leaves glabrous beneath . . . . . 1. *Q. alba.*
  - *c.* Mature leaves finely pubescent beneath *d.*
    - *d.* Scales of the cup naked, not awned.
      - Fruit nearly sessile; the fine-scaled saucer-shaped cup one third to half as high as the ovoid acorn . . . . 2. *Q. stellata.*
      - Fruit peduncled; the coarse-scaled cup nearly covering the depressed-globose acorn . . . . . 3. *Q. lyrata.*
    - *d.* Upper scales of the cup long-awned . . . . . 4. *Q. macrocarpa.*
- *b.* Leaves coarsely sinuate-toothed, but not lobed (except slightly in no. 5). — Chestnut Oaks *e.*
  - *e.* Fruiting peduncle 2.5–6 cm. long, much exceeding the petioles . 5 *Q. bicolor.*

e. Fruit sessile or on very short peduncles.
Cup 2.5–3 cm. broad; scales free to the base . . . . 6. *Q. Michauxii.*
Cup at most 2.5 cm. broad, only the small tips of the scales distinct.
Leaves with acute or pointed teeth.
Leaves with 8–13 teeth on each margin . . 7. *Q. Muhlenbergii.*
Leaves with 3–7 teeth on each margin . . 8. *Q. prinoides.*
Leaves with somewhat rounded teeth . . . . . 9. *Q. Prinus.*
a. Leaves coriaceous, evergreen, entire or rarely spiny-toothed . . 10. *Q. virginiana.*
§ 2. Bark dark, furrowed; leaves deciduous, their lobes and teeth acute and bristle-pointed (at least in youth); stamens mostly 4–6; cup-scales membranaceous; styles long and spreading; abortive ovules near the top of the perfect seed; inner surface of shell tomentose; fruit maturing the second year. — ERYTHROBÁLANUS Spach. (RED or BLACK OAKS.) *f.*
f. Leaves pinnatifid or lobed, slender-petioled, not coriaceous, the lobes or teeth conspicuously bristle-pointed *g.*
g. Mature leaves green on both sides; species closely related and freely hybridizing *h.*
h. Longest lobes of the leaf about equaling (never twice as long as) the breadth of the broadish middle portion of the leaf . . 11. *Q. rubra.*
h. Longest lobes of the leaf 2–6 times as long as the breadth of the narrow middle portion of the leaf *i.*
i. Scales of the cup closely appressed *j.*
j. Expanded saucer-shaped portion of the cup 3–5 mm. high, 1–1.5 cm. broad . . . . . 12. *Q. palustris.*
j. Cups larger.
Cups brown or castaneous, the scales finally glabrate and lustrous . . . . . 13. *Q. coccinea.*
Cups ashy with persistent dull pubescence.
Cup 2–2.6 cm. broad; acorn 1.8–2.3 cm. thick . . . 14. *Q. texana.*
Cup 1.2–1.8 cm. broad; acorn 0.8–1.7 cm. thick . . 15. *Q. ellipsoidalis.*
i. Upper scales of the cup loosely imbricated . . . . 16. *Q. velutina.*
g. Mature leaves whitish or grayish beneath with close down.
Lobes elongate, at least the terminal falcate . . . . . 17. *Q. falcata.*
Lobes broadly triangular . . . . . 18. *Q. ilicifolia.*
f. Leaves entire or with few teeth (or somewhat 3–5-lobed at summit), commonly bristle-pointed; acorns globular, small (rarely over 13 mm. long) *k.*
k. Leaves widening or often much dilated upward and more or less sinuate or 3–5-lobed.
Leaves glabrous; cup saucer-shaped or hemispherical . . . 19. *Q. nigra.*
Leaves rusty-pubescent beneath; cup turbinate . . . 20. *Q. marilandica.*
k. Leaves not dilated upward, generally entire.
Leaves permanently stellate-pubescent beneath . . . 21. *Q. imbricaria.*
Leaves glabrous or glabrate beneath . . . . . 22. *Q. phellos.*

670. Q. alba.

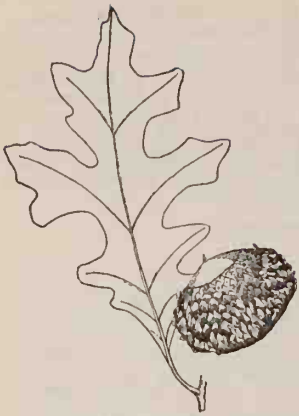
1. Q. álba L. (WHITE O.) *Leaves* when young white-lanate beneath, *when mature pale or glaucous beneath*, bright green above, obovate-oblong, *obliquely cut into* 5–9 oblong or linear and obtuse *mostly entire lobes;* cup hemispherical-saucer-shaped, rough or tubercled at maturity, puberulent, much shorter than the ovoid or ellipsoid (2–3 cm. long) acorn. — Dryish or upland woods, s. Me. to Ont., Minn., and southw. FIG. 670.

2. Q. stellàta Wang. (POST O., IRON O.) *Leaves grayish- or brownish-downy underneath*, dark green and *rough above*, thickish, sinuately cut into 5–7 *rounded divergent lobes, the upper ones much larger and often* 1–3-*notched;* acorn 1–2 cm. long. (*Q. minor* Sarg.) — Sandy or sterile soil, Mass. to Ia., Neb., and southw. FIG. 671.


671. Q. stellata.

Q. MARGARÉTTA Ashe, with narrower small leaves glabrate and with lobes merely rounded at tip, is possibly a hybrid of *Q. stellata* and *Q. álba.*

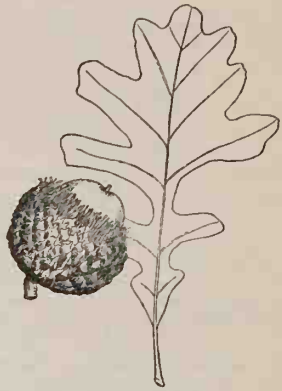
3. Q. lyràta Walt. (OVER-CUP O., SWAMP POST O.) *Leaves* crowded at the end of the branchlets, obovate-oblong, acute at base, more or less deeply 7–9-lobed,



672. Q. lyrata.

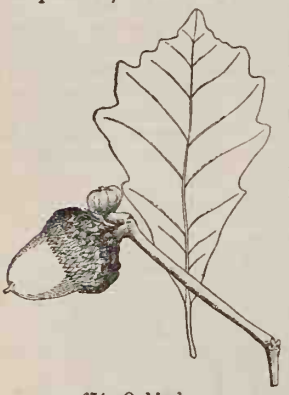
white-tomentose beneath or at length smoothish, the lobes triangular to oblong, acute or obtuse, entire or sparingly toothed; cup round-ovoid, thin, with rugged pointed scales; acorn about 2 cm. long. — River swamps, N. J. to Ind., Mo., and southw. Fig. 672.

4. **Q. macrocárpa** Michx. (Bur O., Overcup or Mossy-cup O.) *Leaves* obovate or oblong, lyrately pinnatifid or deeply sinuate-lobed, or nearly parted, sometimes nearly entire, irregular, *downy or pale beneath; the lobes sparingly and obtusely toothed, or the smaller ones entire; cup* deep, thick and woody (2–5 cm. across), *with* hard and thick *pointed conspicuously imbricated scales, the upper ones awned*, usually making a mossy-fringed border; acorn broadly ovoid, half immersed in or entirely inclosed by the cup. — Rich soil, N. S. to Man., s. to w. Mass., Ky., and Tex. — A large and valuable tree; extremely variable in the size and fringe of the cups. Fig. 673. Var. olivaeformis (Michx. f.) Gray is a narrower-leaved form with small subcylindric acorns.



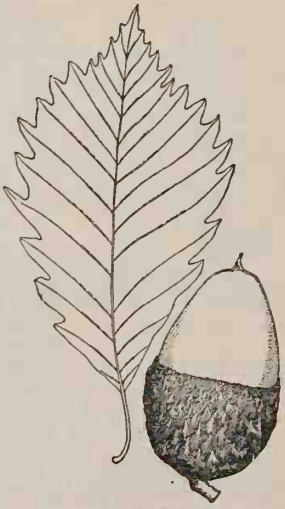
673. Q. macrocarpa.

5. **Q. bicolor** Willd. (Swamp White O.) *Leaves obovate or oblong-obovate*, wedge-shaped at base, *coarsely sinuate-crenate* and *often* rather *pinnatifid* than toothed, *usually soft-downy and white-hoary beneath*, the primary veins lax and little prominent; *cup* $\frac{1}{3}$–$\frac{1}{2}$ as long as the acorn, *woody, the upper scales awn-pointed*, sometimes forming a mossy-fringed margin; acorn 2–3 cm. long. (*Q. platanoides* Sudworth.) — Borders of streams and swamps, s. Me. to Ont., Minn., and southw. — A large tree, with flaky bark. Fig. 674.

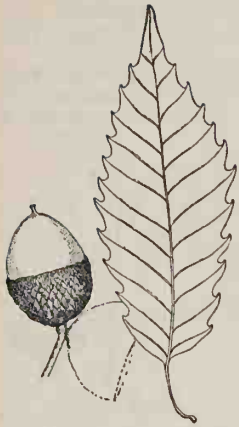


674. Q. bicolor.

6. **Q. Michaúxii** Nutt. (Basket O., Cow O.) *Leaves* oval or obovate, acute, obtuse, or even cordate at base, *regularly dentate* (seldom deeply), rather rigid, commonly *tomentose beneath;* stamens usually 10; fruit short-peduncled; cup shallow, tuberculate with hard and stout acute scales, tips of the innermost often forming a stiff fringe; acorn ovoid-subcylindric, twice as high as the cup, about



675. Q. Michauxii.



676. Q. Muhlenbergii.

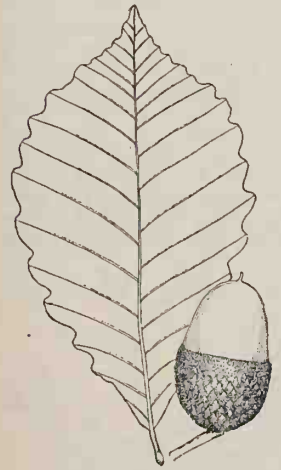
3 cm. long. — Borders of streams and swamps, Del. to Mo., and southw. Fig. 675.

7. **Q. Muhlenbérgii** Engelm. (Yellow O., Chestnut O.) *Leaves* (1–2 dm. long) *slender-petioled*, often oblong or even lanceolate, usually acute or pointed, mostly obtuse or rounded at base, almost equally and *rather sharply toothed; cup* subsessile, shallow, *thin, of small appressed scales;* acorn globose or obovoid, 1.5–2 cm. long. (*Q. acuminata* Houba.) — Dry limestone hillsides and rich bottoms, Vt. to Del., along the mts. to n. Ala., w. to Minn., e. Neb., and Tex. — A tall tree, with thin eventually flaky bark. Fig. 676.

677. Q. prinoides.

8. **Q. prinoìdes** Willd. Like the last, but *of low stature* (usually 1–3 m. high), with *smaller more undulate leaves on shorter petioles* (rarely 1 cm. long), and deeper *cups with more tumid scales.* — Dry soil, N. H. to Minn., and southw. — Branchlets glabrous; leaves covered beneath with a close white tomentum. Fig. 677. Var. ruféscens Rehder differs in having the young branchlets pubescent and some tawny wool mixed with the white tomentum on the under surface of the leaves. — Damp woods and pine-barrens, e. Mass. to N. C.

9. **Q. Prìnus** L. (Chestnut O.) *Leaves* thick, obovate or oblong to lanceolate, sometimes acuminate, with an obtuse or acute base, *undulately crenate-toothed*, pale and minutely downy beneath, the primary ribs 10–16 pairs, straight, prominent beneath; fruiting peduncles shorter than the petioles, often very short; *cup thick*, mostly tuberculate *with hard and stout scales.* — Rocky banks and hillsides, s. Me. to Ont., and southw. — A large tree, with thick and deeply furrowed bark. Fig. 678.

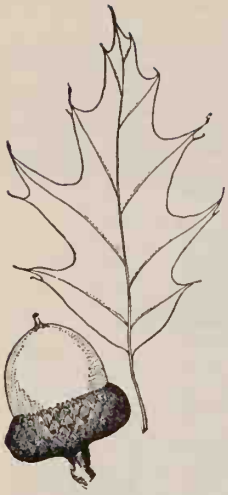


678. Q. Prinus.

10. **Q. virginiàna** Mill. (Live O.) *Leaves* small, *oblong or elliptical, hoary beneath* (as well as on the branchlets); peduncle usually conspicuous, 1–3-fruited; cup top-shaped; acorn subcylindric; cotyledons completely united into one mass. (*Q. virens* Ait.) — Along the coast from Va. to Fla. and Tex. — Becoming a large tree, or in sterile soil dwarf. Fig. 679.

679. Q. virginiana.

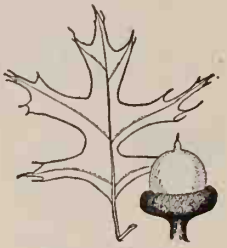
11. **Q. rùbra** L. (Red O.) *Cup saucer-shaped or flattish*, with a narrow raised border, 1.8–2.5 cm. broad, of rather fine closely appressed scales, sessile or on a very abrupt narrow stalk or neck, *very much shorter than the narrow-ovoid or ellipsoid acorn*, which is 2–3 cm. long; leaves rather thin, turning dark red after frost, moderately (rarely very deeply) pinnatifid, the lobes acuminate from a broad base, with a few coarse teeth; bark of trunk dark gray, smoothish. — Common both in rich and poor soil. — Timber coarse and poor. Fig. 680. Along our northern borders passing to Var. ambígua (Michx. f.) Fernald. (Gray O.) *Cups*



680. Q. rubra.

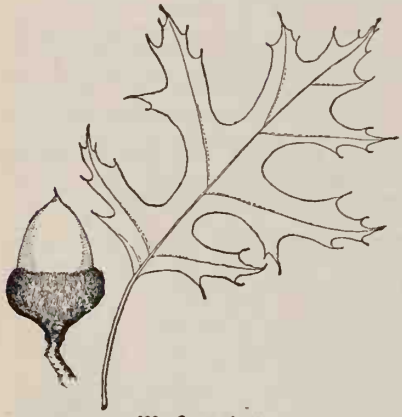
tending to be deeper and somewhat *turbinate*. (Q. *ambigua* and *borealis* Michx. f.; *Q. coccinea*, var. *ambigua* Gray.)

12. Q. palústris Muench. (Swamp Spanish or Pin O.) *Cup flat-saucer-shaped*, sometimes contracted into a short scaly base or stalk, fine-scaled, *very much shorter than the usually globose or depressed acorn*, which is 1–1.5 cm. long; leaves deeply pinnatifid with divergent lobes and broad rounded sinuses.—Low grounds, chiefly on the coastal plain and in the Miss. basin; Mass. to Va., w. to Kan. and Ark. Fig. 681.



681. Q. palustris.

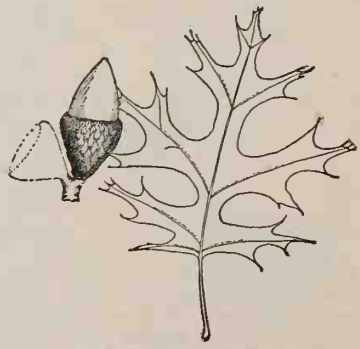
13. Q. coccínea Muench. (Scarlet O.) *Cup top-shaped, or hemispherical with a conical base* (1.5–2.2 cm. broad), coarsely scaly, covering half or more of the *subglobose or short ovoid acorn* (1.3–2 cm. long), the *scales brown, appressed* and *glabrate; leaves*, at least on full-grown trees, bright green, shining above, *glabrous beneath*, turning red in autumn, deeply pinnatifid, the slender lobes divergent and sparingly cut-toothed; buds small; *bark* of the trunk gray, the *interior reddish*.—Dry light soil, s. Me. to Ont., Minn., and Neb., s. to N. C. and Ill., chiefly eastw. Fig. 682.



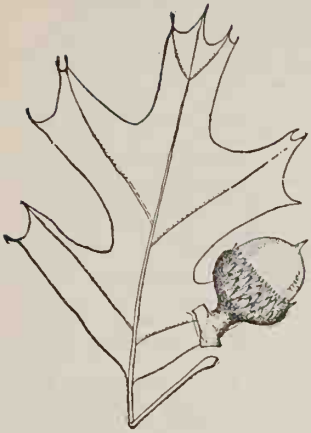
682. Q. coccinea.

14. Q. texàna Buckley. (Red O.) *Cup deeply saucer-shaped or somewhat turbinate*, 2–2.6 *cm. broad*, the light brown or ashy *scales permanently tomentulose*, except on the margin, covering one third to one half of the ovoid *large* (1.5–4 *cm. long*) *acorn; leaves* in maturity bright green and glabrous above, paler and *with axillary tufts of hairs beneath*, turning dark red or brown in autumn, the 5–9 oblong lobes slightly broadened upward and toothed at summit; bark gray, becoming in old trees reddish-brown and broken into plates.—Bottom-lands and limestone hills, Ind. to Ia., s. to N. C., Fla., and Tex.—A large tree with conspicuously buttressed base.

15. Q. ellipsoidàlis E. J. Hill. (Yellow or Black O.) *Cup turbinate or deeply saucer-shaped*, 1.2–1.8 *cm. broad*, the pale brown or ashy *scales puberulent*, covering from one third to more than one



683. Q. ellipsoidalis.



684. Q. velutina.

half of the dark-brown puberulent often striped ellipsoid to subglobose *small* (1.2–2 *cm. long*) *acorn; leaves* smooth and lustrous in age, *with axillary tufts beneath*, becoming yellow or pale brown in autumn, the 5–7 oblong lobes coarsely toothed at summit; *bark* gray, *close and smooth*, or in age shallowly fissured, *light yellow within.*—Clay or gravel, s. Mich. to Man. and Ia.—A medium-sized tree, in habit said to resemble the eastern *Q. palustris.* Fig. 683.

16. **Q. velùtina** Lam. (Quercitron, Yellow-barked or Black O.) *Cup turbinate, or hemispherical with a conical base*, 1.8–2.3 cm. broad, its *upper pubescent* thin light-chestnut *scales loosely imbricated or squarrose when dry;* acorns ovoid to hemispherical, 1.2–2 cm. long, light-brown, often pubescent; leaves variously divided, ordinarily with hairy tufts in the axils beneath, turning brownish, orange, or dull red in autumn; *bark* dark-brown and rough, *internally orange.* (*Q. tinctoria* Bartr.; *Q. coccinea*, var. *tinctoria* A. DC.)—Dry or gravelly uplands, s. Me. to w. Ont., and southw.—The bark is largely used in tanning. Fig. 684. Var. missouriénsis Sarg. Leaves with permanent rusty pubescence beneath, and cup-scales tomentose.—Mo. and Ark.

17. **Q. falcàta** Michx. (Spanish O.) *Leaves grayish-downy or fulvous underneath*, 3–5-*lobed above* (sometimes entire); *the lobes prolonged, mostly narrow and more or less scythe-shaped*, especially the terminal one, entire or sparingly cut-toothed; acorn globose, 8–10 mm. long; cup saucer-shaped with a somewhat top-shaped base and about half the length of the acorn. (*Q. digitata* Sudworth; *Q. pagodaefolia* Ashe.)—Dry or sandy soil, N. J. to Fla.; and from s. Ind. to Mo. and Tex.—A large or small tree, extremely variable in foliage; bark excellent for tanning. Fig. 685.

685. Q. falcata.

18. **Q. ilicifòlia** Wang. (Bear or Black Scrub O.) Dwarf (1–3, rarely 6, m. high), straggling; *leaves* (5–10 cm. long) thickish, *obovate, wedge-shaped at base, angularly about* 5(3–7)-*lobed, white-downy beneath;* lobes short and triangular, spreading; acorn 10–12 mm. long. (*Q. nana* Sarg.)—Sandy barrens and rocky hills, N. E. to O. and Ky. Fig 686.

686. Q. ilicifolia.

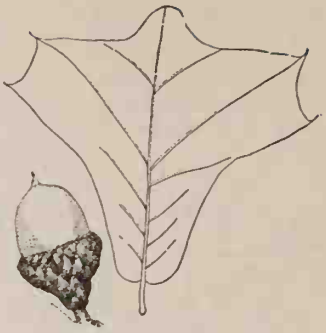
19. **Q. nìgra** L. (Water O.) *Leaves glabrous and shining, obovate-spatulate or narrowly wedge-form, with a long tapering base* and an often obscurely 3-lobed summit, varying to oblanceolate. (*Q. aquatica* Walt.)—Wet ground, around ponds, etc., Del. to the Gulf; and from Ky. and Mo. to Tex.—Tree 8–12 m. high; running into many varieties, especially southw.; the leaves on seedlings and strong shoots often in-

687. Q. nigra.

cised or sinuate-pinnatifid (then mostly bristle-pointed). Fig. 687.

20. **Q. marilándica** Muench. (Black Jack or Barren O.) *Leaves broadly wedge-shaped*, but sometimes rounded or obscurely cordate at the base, *widely dilated* and somewhat 3(rarely 5)-lobed at the summit, occasionally with one or two lateral conspicuously bristle-tipped lobes or teeth, *rusty-pubescent beneath*, shining above, large, 1–2.5 dm. long. (*Q. nigra* Man. ed. 6, not L.) — Dry sandy barrens, or heavy clay soil, L. I. to s. Minn., e. Neb., and southw. — A small tree of little value. Fig. 688.

687. Q. imbricaria.



688. Q. marilandica.

21. **Q. imbricària** Michx. (Laurel or Shingle O.) *Leaves lanceolate or lance-oblong*, thickish, smooth and *shining above*, *downy beneath*, *the down usually persistent*; cup between saucer-shaped and top-shaped. — Rich woodlands, Pa. to Ga., w. to s. Wisc., e. Neb., and Ark.; locally, e. Mass. (*Kennedy*). — Tree 8–27 m. high. Fig. 689.

22. **Q. phéllos** L. (Willow O.) *Leaves linear-lanceolate*, *narrowed to both ends*, *soon glabrous*, light green (about 1 dm. long); cup saucer-shaped. — Bottom-lands or rich sandy uplands, Staten I., N. Y. to Fla., w. to Ky., Mo., and Tex. Fig. 690. Var. laurifòlia (Michx.) Chapm. (Laurel O.) Leaves oblong, usually larger. (*Q. laurifolia* Michx.) — N. J. to Fla. and La.

690. Q. phellos.

URTICÀCEAE (Nettle Family)

Plants with stipules, and monoecious or dioecious or rarely (in the Elm Tribe) *perfect flowers, furnished with a regular calyx free from the* 1(*rarely* 2)-*celled ovary which forms a* 1-*seeded fruit; the embryo in the albumen when there is any, its radicle pointing upward; stamens as many as the lobes of the calyx and opposite them, or sometimes fewer.* Cotyledons usually broad. Stipules often deciduous. — A large family (far the greater part tropical).

Tribe I. **ÚLMEAE**. Flowers mostly polygamous, upon the last year's branches. Anthers erect in the bud, extrorse. Styles or stigmas 2. Seed suspended. Embryo straight. — Trees, with alternate serrate pinnately veined leaves and fugacious stipules.

1. **Ulmus**. Ovary 1–2-ovuled. Fruit winged all around.
2. **Planera**. Flowers appearing with the leaves. Ovule one. Fruit wingless, nut-like.

Tribe II. **CELTÍDEAE**. As in Tribe I., but the monoecious-polygamous flowers upon branches of the same year. Anthers introrse. Fruit a drupe. Embryo curved.

3. **Celtis**. Ovary 1-ovuled. Flowers appearing with the leaves. Leaves 3-nerved at base.

Tribe III. **CANNABÍNEAE**. Flowers dioecious; the sterile racemed or panicled; the fertile in clusters or catkins, the calyx of one sepal embracing the ovary. Filaments short, erect in the bud. Stigmas 2, elongated. Ovary 1-celled, with a pendulous ovule, forming a small glandular

achene in fruit. Embryo curved or coiled. — Herbs with watery juice, mostly opposite lobed or divided leaves and persistent stipules.

4. **Cannabis.** Fertile flowers spiked-clustered. Leaves 5–7-divided. Erect.
5. **Humulus.** Fertile flowers in a short spike forming a membranaceous catkin in fruit. Leaves 3–5-lobed. Climbing.

Tribe IV. MÒREAE. Flowers unisexual; calyx becoming fleshy or juicy in fruit. Anthers inflexed in the bud. Ovule pendulous. Fruit an achene. Embryo curved. — Trees or shrubs, with milky juice, alternate leaves, and fugacious stipules.

6. **Maclura** Sterile flowers in loose racemes; fertile in globose heads. Leaves entire.
7. **Broussonetia.** Sterile flowers in dense catkins; the fertile in globose heads. Leaves serrate, often lobed.
8. **Morus.** Fertile and sterile flowers in separate spikes. Leaves dentate, 3-nerved.

Tribe V. URTÍCEAE. Flowers unisexual. Filaments inflexed in the bud. Style or stigma simple. Ovary 1 celled, with an erect ovule, forming an achene in fruit. Embryo straight. — Herbs with watery juice.

* Calyx in the fertile flowers of 2–5 separate or nearly separate sepals.

+ Plant beset with stinging bristles.

9. **Urtica.** Sepals 4 in both fertile and sterile flowers. Achene straight and erect, inclosed by the 2 inner and larger sepals. Stigma capitate-tufted. Leaves opposite.
10. **Laportea.** Sepals 5 in the sterile flowers, 4 in the fertile, or apparently only 2. Stigma long-subulate. Achene very oblique, deflexed, nearly naked. Leaves alternate.

+ + Plant wholly destitute of stinging bristles; leaves opposite.

11. **Pilea.** Sepals 3 or 4, those of the fertile flowers unequal, all or all but one small. Achene partly naked, straight and erect. Stigma pencil-tufted. Smooth and shining.

* * Fertile calyx tubular or cup shaped, inclosing the achene; unarmed.

12. **Boehmeria.** Flower-clusters spiked, not involucrate. Style long and thread-shaped, stigmatic down one side. Leaves opposite, serrate.
13. **Parietaria.** Flowers in involucrate-bracted clusters. Stigma tufted. Leaves alternate, entire.

1. ÚLMUS [Tourn.] L. Elm

Calyx bell-shaped, 4–9-cleft. Stamens 4–9, with long and slender filaments. Ovary 1–2-celled, with a single anatropous ovule suspended from the summit of each cell; styles 2, short, diverging, stigmatic along the inner edge. Fruit a 1-celled and 1-seeded membranaceous samara. Albumen none; cotyledons large. — Flowers purplish or yellowish, in lateral clusters. Leaves strongly straight-veined, short-petioled, and oblique or unequally somewhat heart-shaped at base. Stipules small, caducous. (The classical Latin name.)

* *Flowers nearly sessile; fruit orbicular, not ciliate; leaves very rough above.*

1. **U. fúlva** Michx. (Slippery or Red E.) Buds before expansion soft-downy with rusty hairs; leaves ovate-oblong, taper-pointed, doubly serrate, 1–2 dm. long, sweet-scented in drying, soft-downy beneath or slightly rough downward; *branchlets and pedicels downy;* calyx-lobes and stamens 5–9; *fruit* (1.6–1.8 cm. wide) *with the cell pubescent.* — Rich soil, w. Que. and N. E. to L. Huron, the Dakotas, and southw. Mar., Apr. — A small or middle-sized tree (15–20 m. high), with tough reddish wood, and a very mucilaginous inner bark.

2. **U. campéstris** L. (English E.) A large irregularly branched tree with *glabrous pedicels* and large suborbicular *glabrous fruit.* — Commonly planted for shade, and tending to escape. — Variable; some forms with corky-winged branchlets. (Introd. from Eu.)

* * *Flowers on slender drooping pedicels, which are jointed above the middle; fruit ovate or oval, fringed-ciliate; leaves smooth above or nearly so.*

+ *Flowers vernal, appearing before the leaves.*

3. **U. americàna** L. (American or White E.) *Buds glabrous; branches not corky;* leaves obovate-oblong or oval, abruptly pointed, sharply and often

doubly serrate (5–10 cm. long), soft-pubescent beneath or soon glabrate; *flowers in close fascicles;* calyx with 7–9 roundish lobes; *fruit glabrous* except the margins (1.2 cm. long), its sharp points incurved and closing the notch. — Moist woods, especially along rivers, in rich soil. Apr. — A large and well-known ornamental tree, variable in habit, usually with spreading branches and drooping branchlets.

4. **U. racemòsa** Thomas. (Cork or Rock E.) *Bud-scales downy-ciliate* and somewhat pubescent, as are the young branchlets; *branches often with corky ridges;* leaves nearly as in the last, but with veins more simple and straight; *flowers racemed;* fruit much as in the last, but rather larger. (*U. Thomasi* Sarg.) — River-banks and calcareous ridges, w. Que. and w. Vt. to Ont. and Minn., s. to Mo. and Ky. — A large and very valuable tree.

5. **U. alàta** Michx. (Wahoo or Winged E.) *Bud-scales and branchlets nearly glabrous; branches,* at least some of them, *corky-winged*; leaves downy beneath, ovate-oblong and oblong-lanceolate, acute, thickish, small (3–6 cm. long); calyx-lobes obovate; fruit downy on the face when young. — Va. to s. Ind., s. Mo., and southw. Mar. — A small tree.

+ + *Flowers autumnal, appearing long after the leaves.*

6. **U. serótina** Sarg. Tree of moderate size; leaves narrowly obovate, acuminate, doubly serrate, paler and soft-pubescent beneath; flowers racemose; *calyx cleft nearly to the base,* its divisions very narrow; fruit rhombic-ovate, 2-horned, 5 mm. broad. — Limestone hills and bottoms, s. Ky. to n. Ala. and Ga.

2. PLANÈRA J. F. Gmel. Planer Tree

Flowers monoeciously polygamous. Calyx 4–5-cleft. Stamens 4–5. Ovary ovoid, 1-celled, 1-ovuled, with 2 spreading styles which are stigmatose down the inner side, in fruit becoming coriaceous. — Trees with small leaves, like those of Elms, the flowers appearing with them in small axillary clusters. (Named for *J. J. Planer*, 1743–1789, a German botanist and professor at Erfurt.)

1. **P. aquática** (Walt.) J. F. Gmel. (Water Elm.) Nearly glabrous; leaves ovate-oblong, small; fruit stalked in the calyx, beset with irregular rough projections. — Coastal swamps, N. C. to Fla. and Tex.; inland in the Miss. basin to Mo., s. Ill. and Ky. Apr. — A rather small tree.

3. CÉLTIS [Tourn.] L. Nettle-tree. Hackberry

Calyx 5–6-parted, persistent. Stamens 5–6. Ovary 1-celled, with a single suspended ovule; stigmas 2, long and pointed, recurved. Cotyledons folded and crumpled. — Flowers greenish, axillary, the fertile solitary or in pairs, peduncled, appearing with the leaves, the lower usually staminate only, fascicled or racemose along the base of the branches of the season. (A name of Pliny's for an African species of Lotus, transferred to this genus perhaps on account of the sweet berries).

1. **C. occidentàlis** L. (Sugarberry.) *Leaves reticulated,* ovate, cordate-ovate and ovate-lanceolate, taper-pointed, usually conspicuously and sharply so, more or less oblique at base, *sharply serrate,* sometimes sparingly so or only toward the apex, scabrous but mostly glabrous above, usually soft-pubescent beneath, at least when young; fruit reddish or yellowish, turning dark purple at maturity, its peduncle once or twice the length of the petiole. (*C. canina* Raf.) — Woods and river-banks, w. Que. and N. E. to Man., and southw. Apr., May. — A small or sometimes large tree, with the aspect of an Elm, bearing sweet and edible fruits as large as bird-cherries, at first obovoid, ripe in autumn; the flesh thin. Variation as to stature, foliage, form and color of fruit, etc., great in extent but without clear correlation. Var. pùmila Muhl. is a dwarf form, being merely a low straggling shrub. Var. crassifòlia (Lam.) Gray is a tree and may often be distinguished by its pubescent branchlets and large (9–13 cm. long) commonly cordate leaves scabrous on the upper surface.

2. **C. mississippiénsis** Bosc. *Leaves entire* (rarely few-toothed), *very long-*

taper-pointed, rounded at base, mostly oblique, thin, and smooth; fruit small. — Chiefly in rich bottom-lands, s. Ind. to Mo. (*Bush*), and s. to Fla. and Tex. — A small tree with warty bark. (Mex., Bermuda.)

4. CÁNNABIS [Tourn.] L. Hemp

Flowers green; the sterile in axillary compound racemes or panicles, with 5 sepals and 5 drooping stamens. Achene crustaceous. Embryo simply curved. — A tall roughish annual, with digitate leaves of 5–7 linear-lanceolate coarsely toothed leaflets, the upper alternate; the inner bark of very tough fibers. (The ancient Greek name, of obscure etymology.)

1. **C.** satìva L. — Waste and cultivated ground. (Adv. from Asia.)

5. HÙMULUS L. Hop

Flowers dioecious; the sterile in loose axillary panicles, with 5 sepals and 5 erect stamens. Fertile flowers in short axillary and solitary spikes or catkins; bracts foliaceous, imbricated, each 2-flowered, in fruit forming a sort of membranaceous strobile. Achene invested with the enlarged scale-like calyx. Embryo coiled in a flat spiral. — Twining rough perennials, with stems almost prickly downward, and mostly opposite heart-shaped and palmately 3–7-lobed leaves. (A late Latin name, of Teutonic origin.)

1. **H. Lùpulus** L. (Common H.) Leaves mostly 3–5-lobed, commonly longer than the petioles; bracts, etc., smoothish; the fruiting calyx, achene, etc., sprinkled *with yellow resinous grains*, which give the bitterness and aroma to the hop. — Alluvial banks, rubbish heaps, etc., common. July. (Eurasia.)

2. **H.** japónicus Sieb. & Zucc., with smaller more deeply 5-lobed leaves and herbaceous bracts *without glandular atoms*, occasionally escapes from frequent cultivation. (Introd. from Japan.)

6. MACLÙRA Nutt. Osage Orange. Bois d'Arc

Flowers dioecious; the staminate in loose short racemes, with 4-parted calyx, and 4 stamens inflexed in the bud; the pistillate in a dense globose head, with a 4-cleft calyx inclosing the ovary. Style filiform, long-exserted; ovule pendulous. Fruit an achene, buried in the greatly enlarged fleshy calyx. Albumen none. Embryo recurved. — Trees with entire pinnately veined leaves, axillary peduncles, and stout axillary spines. (Named for the early American geologist, *William Maclure.*)

1. **M. pomífera** (Raf.) Schneider. A tree 10–15 m. high; leaves ovate to oblong-lanceolate, pointed, mostly rounded at base, green and shining; syncarp globose, yellowish-green, 7–10 cm. in diameter. (*Ioxylon* Raf.; *Toxylon* Sarg.; *M. aurantiaca* Nutt.) — Rich soil, s. Mo. to n. Tex.; extensively used for hedges and sometimes spontaneous eastw. — Wood bright orange.

7. BROUSSONÈTIA L'Hér.

Flowers dioecious; the sterile in flexuous aments; calyx 4-parted; stamens 4; filaments inflexed in bud; fertile flowers in dense globular tomentose heads. Leaves alternate, ovate, often irregularly lobed, pubescent and more or less scabrous. (Named for *Auguste Broussonet*, of Montpellier, physician and naturalist.)

1. **B.** papyrífera (L.) Vent. (Paper Mulberry.) Often cultivated and said to escape in the Middle Atlantic States and southw. (Introd. from Asia.)

8. MÒRUS [Tourn.] L. Mulberry

Flowers monoecious or dioecious. Calyx 4-parted; lobes ovate. Stamens 4; filaments elastically expanding. Ovary 2-celled, one of the cells smaller and disappearing; styles 2, thread-form, stigmatic down the inside. Achene ovate,

compressed, covered by the succulent berry-like calyx, the whole spike thus becoming a thickened oblong and juicy (edible) aggregate fruit. (The classical Latin name.)

1. **M. rùbra** L. (Red M.) *Leaves* heart-ovate, serrate, *rough above, downy beneath*, pointed (on young shoots often lobed); flowers frequently dioecious; *fruit dark purple*, long. — Rich woods, w. N. E. to s. Ont., the Dakotas, e. Kan., and southw. May. — Large tree, ripening its blackberry-like fruit in July.

2. **M. álba** L. (White M.) *Leaves* obliquely heart-ovate, acute, serrate, sometimes lobed, *smooth and shining; fruit whitish.* — Spontaneous near houses. (Introd. from Eu.)

9. URTÌCA [Tourn.] L. Nettle

Flowers monoecious, or rarely dioecious, clustered, the clusters mostly in racemes, spikes, or loose heads. *Ster. Fl.* Sepals 4. Stamens 4, inserted around the cup-shaped rudiment of a pistil. *Fert. Fl.* Sepals 4, in pairs; the 2 outer smaller and spreading; the two inner flat or concave, in fruit membranaceous and inclosing achene. — Stipules in our species distinct. Flowers greenish; in summer. (The classical Latin name; from *urere*, to burn.)

* *Perennials; flower-clusters in branching panicled spikes, often dioecious.*

← *Petiole more than half as long as the leaf-breadth.*

1. **U. grácilis** Ait. Slender (0.6–3 m. high), sparingly bristly and often with some short grayish pubescence; *leaves narrowly lance-oblong*, 1–5 cm. broad, pointed, serrate, 3–5-nerved from the rounded or scarcely heart-shaped base, *almost glabrous*, with relatively small teeth (25–35 on each side the middle leaves); spikes slender and loosely panicled. — Fence-rows and moist ground, common.

2. **U. Lyállii** Wats. Sparingly bristly and sometimes grayish pubescent; *leaves ovate or ovate-lanceolate*, mostly 3–7 cm. broad, usually cordate, with fewer and coarser teeth (15–23 on each side); otherwise much like the preceding. — Alluvial thickets and waste places, Nfd. to Ct. and w. N. Y.; also Rocky Mts. and westw.

← ← *Petioles less than half as long as the leaf-breadth.*

3. **U. dioíca** L. (Stinging N.) *Very bristly and stinging*, 6–9 dm. high; *leaves ovate-heart-shaped*, pointed, *very deeply serrate, downy beneath* as well as the upper part of the stem; *spikes much branched.* — Waste places and roadsides, rather rare. (Nat. from Eu.)

* * *Annuals; flower-clusters chiefly axillary and shorter than the petiole, androgynous.*

4. **U. ùrens** L. *Leaves elliptical or ovate*, very coarsely and deeply serrate with long spreading teeth, the terminal teeth not longer than the lateral ones; *flower-clusters 2 in each axil, small and loose.* — Waste grounds, near dwellings, eastw.; scarce. — Plant 1–3 dm. high, with sparse stings. (Nat. from Eu.)

5. **U. chamaedryoides** Pursh. *Leaves ovate and mostly heart-shaped*, the upper ovate-lanceolate, coarsely serrate-toothed; *flower-clusters globular*, 1–2 in each axil, and spiked at the summit. — Alluvial shaded soil, from Ky. to the Gulf States; casual northw. — Slender, 2–7 dm. high, sparsely beset with stings.

10. LAPÓRTEA Gaud. Wood Nettle

Flowers monoecious or dioecious, clustered, in loose cymes; the upper widely spreading and chiefly or entirely fertile; the lower mostly sterile. *Ster. Fl.* Sepals and stamens 5, with a rudiment of an ovary. *Fert. Fl.* Calyx of 4 sepals, the two outer or one of them usually minute, and the two inner much larger. Stigma hairy down one side, persistent. Achene ovate, flat, reflexed on the winged or margined pedicel, nearly naked. — Perennial herbs with large serrate leaves, and axillary stipules. (Named for *François L. de Laporte*, Count of Castelnau, Entomologist of the 19th century.)

1. **L. canadénsis** (L.) Gaud. Stem 6–9 dm. high; leaves ovate, pointed, strongly feather-veined (7–15 cm. long), long-petioled; fertile cymes divergent, stipule single, 2-cleft. (*Urticastrum divaricatum* Ktze.) — Rich woods, N. B. to Ont., Minn., and southw. July–Sept.

11. PÍLEA Lindl. Richweed. Clearweed

Flowers monoecious or dioecious. *Ster. Fl.* Sepals and stamens 3–4. *Fert. Fl.* Sepals 3, more or less unequal, a rudiment of a stamen commonly before each in the form of a hooded scale. — Stingless, mostly glabrous and low herbs, with united stipules; the staminate flowers often mixed with the fertile. (Named from the shape of the larger sepal of the fertile flower in the original species, which partly covers the achene, like the *pileus*, or felt cap, of the Romans.)

1. **P. pùmila** (L.) Gray. Low (1–5 dm. high); stems smooth and shining, pellucid; leaves ovate, coarsely toothed, pointed, 3-ribbed and veiny; flower-clusters much shorter than the petioles; sepals of the fertile flowers lanceolate, scarcely unequal. (*Adicea* Raf.) — Cool and moist shaded places. July–Sept.

12. BOEHMÈRIA Jacq. False Nettle

Flowers monoecious or dioecious, clustered; the sterile much as in *Urtica;* the fertile with a tubular or urn-shaped entire or 2–4-toothed calyx inclosing the ovary. Style elongated-awl-shaped, stigmatic and papillose down one side. Achene elliptical, closely invested by the dry and persistent compressed calyx. — No stings. (Named after *G. R. Boehmer*, professor at Wittenberg in the 18th century.)

1. **B. cylíndrica** (L.) Sw. Perennial, smoothish or somewhat pubescent; stem (3–9 dm. high) simple; leaves chiefly opposite (rarely all alternate), ovate to ovate- or oblong-lanceolate, pointed, serrate, 3-nerved; stipules distinct; petioles mostly elongated; flowers dioecious, or the two kinds intermixed, the small clusters densely aggregated in simple and elongated axillary spikes, the sterile interrupted, the fertile often continuous, frequently leaf-bearing at the apex. — Moist or shady ground, centr. Me. to Ont., and southw. — Very variable.

Var. **scàbra** Porter. Leaves oblong-lanceolate, less sharply pointed, smaller, and scabrous-pubescent. — N. J. and Pa., and southw. and westw.

13. PARIETARIA [Tourn.] L. Pellitory

Flowers monoeciously polygamous; the staminate, pistillate, and perfect intermixed in the same cymose axillary clusters; the sterile much as in the last; the fertile with a tubular or bell-shaped 4-lobed and nerved calyx inclosing the ovary and the ovoid achene. — Homely diffuse or tufted herbs, not stinging, with alternate entire 3-ribbed leaves, and no stipules. (The ancient Latin name, because growing on old walls.)

1. **P. pennsylvánica** Muhl. Low, annual, simple or sparingly branched, minutely downy; *leaves oblong-lanceolate*, thin, veiny, roughish, with opaque dots; *flowers shorter than the involucre;* stigma sessile. — Shaded rocky banks, Little Cranberry I., Me. (*Redfield*); e. Mass. and Vt. to Ont., Minn., and southw. June–Aug.

P. débilis Forst., with small *ovate leaves* (8–11 mm. long), few-flowered axillary clusters, and *short involucres* (*about equaling the flowers*), has been found once on Pautuckaway Mt., s.e. N. H. (*Eaton*), where probably of casual introduction. (Eurasia, Pacific N. Am., S. Am.)

SANTALÀCEAE (Sandalwood Family)

Herbs, shrubs, or trees, with entire leaves; the 4–5-*cleft calyx valvate in the bud, its tube coherent with the* 1-*celled ovary; ovules* 2–4, *suspended from the*

apex of a stalk-like free central placenta which rises from the base of the cell, but the (indehiscent) fruit always 1-seeded. — Seed destitute of any proper seed-coat. Stamens equal in number to the lobes of the calyx, and inserted opposite them into the edge of a fleshy disk. Style 1. A small family, chiefly tropical.

1. **Comandra.** Flowers perfect, in umbel-like clusters. Low herbaceous perennials.
2. **Pyrularia.** Flowers dioecious or polygamous. Shrub, with alternate leaves.
3. **Nestronia.** Flowers dioecious. Shrub, with opposite leaves.

1. COMÁNDRA Nutt. Bastard Toad-flax

Flowers perfect. Calyx bell- or urn-shaped, lined above the ovary with an adherent disk which has a 5-lobed free border. Anthers connected by a tuft of thread-like hairs to the calyx-lobes. Fruit drupe-like or nut-like, crowned by the persistent calyx-lobes. Smooth (sometimes parasitic) perennials, with herbaceous stems from a rather woody base, alternate and almost sessile leaves, and greenish-white flowers. (Name from κόμη, *hair*, and ἀνήρ, *a man*, in allusion to the hairs on the calyx-lobes which are attached to the anthers.)

1. **C. umbellàta** (L.) Nutt. Rootstock underground; flowering stems 1.5–4 dm. high, branched, very leafy; *leaves* oblong, *thin*, *pale beneath*, 1–3.5 cm. long, *the pale midrib prominent beneath; inflorescence an ellipsoid panicle* with many cymules of small flowers on *divergent branches;* calyx-tube conspicuously continued as a neck to the dry *globular-urn-shaped fruit; the lobes oblong; style slender.* — Dry ground, centr. Me. to Wisc. and Ga. May, June. — Root forming parasitic attachments to the roots of trees and shrubs.

2. **C. Richardsiàna** Fernald. Rootstock superficial, very elongate and freely branching; flowering stems 0.5–2.5 dm. high, very leafy; the strongly ascending *green leaves* lanceolate to ovate, *firm*, *not paler beneath*, *obscurely veiny; inflorescence corymbose*, 1–3 cm. broad, of 1–6 few-flowered cymules on *ascending branches.* — Dry sandy or gravelly soil, e. Que. to Assina., s. to the Great Lakes, Mo., and Kan. May–Aug.

3. **C. pállida** A. DC. *Leaves narrower*, *more glaucous and acute*, *linear to narrowly lanceolate* (or those upon the main stem oblong), all acute or somewhat cuspidate; *fruit ovoid*, *larger* (6–10 mm. long), sessile or on short stout pedicels. — Minn. to N. Mex. and westw.

4. **C. lívida** Richards. *Peduncles* slender, *axillary*, *3–5-flowered*, shorter than the oval leaves; calyx-tube not continued beyond the ovary, *the lobes ovate; style short;* fruit pulpy when ripe, red. — Bogs, sterile soil, etc., Lab. to Mackenzie, s. to s. N. B., mts. of n. N. E., Mich., and B. C. June, July.

2. PYRULÀRIA Michx. Oil-nut. Buffalo-nut

Calyx 4–5-cleft, the lobes recurved, hairy-tufted at base in the male flowers. Stamens 4 or 5, on very short filaments, alternate with as many rounded glands. Fertile flowers with a pear-shaped ovary invested by the adherent tube of the calyx, naked at the flat summit; style short and thick. Fruit fleshy, pear-shaped. — Shrubs or trees, with alternate short-petioled deciduous leaves and small greenish flowers in short and simple spikes or racemes. (Name a diminutive of *Pyrus*, from the shape of the fruit.)

1. **P. pùbera** Michx. Shrubby, straggling (1–4 m. high), minutely downy when young; leaves obovate-oblong, acute or pointed at both ends, soft, very veiny, minutely pellucid-punctate; spike few-flowered, terminal; calyx 5-cleft; fruit 2.5 cm. long. — Rich woods, mts. of Pa. to Ga. May. — Whole plant, especially the fruit, imbued with an acrid oil.

3. NESTRÒNIA Raf.

Calyx 4–5-lobed. Staminate flowers in 3–8-flowered slender-peduncled umbels; the pistillate solitary, jointed upon short peduncles springing from opposite

axils. Leaves oval, thin, deciduous, short-petioled. (Name said by its author to be derived from a Greek word for Daphne.) DARBYA Gray.

1. **N. umbéllula** Raf. Low shrub, 3–8.5 dm. high; leaves 3–6 cm. long, mostly acute; flowers small, greenish; drupes at length globose, 1–1.3 cm. in diameter. (*Darbya umbellulata* Gray.)—Parasitic on roots of trees, Va. to S. C. and Ala. Apr., May.

LORANTHÀCEAE (MISTLETOE FAMILY)

Chiefly shrubby plants with coriaceous greenish, yellowish, or olive-brown foliage, parasitic on trees.

1. **Phoradendron.** Anthers 2-celled. Berry globose, pulpy. Leaves foliaceous.
2. **Arceuthobium.** Anthers 1-celled. Berry compressed. Leaves scale-like, connate.

1. PHORADÉNDRON Nutt. FALSE MISTLETOE

Flowers small, dioecious, in short catkin-like jointed spikes, usually several to each short fleshy bract or scale, and sunk in the joint. Calyx globular, 3(rarely 2–4)-lobed; in the staminate flowers a sessile anther is borne on the base of each lobe; in the fertile flowers the calyx-tube adheres to the ovary; stigma sessile, obtuse. Berry 1-seeded, pulpy. — Yellowish-green woody parasites on the branches of trees, with jointed much-branched stems and thick firm persistent leaves. (Name composed of *φώρ*, *a thief*, and *δένδρον*, *tree*; from the parasitic habit.)

1. **P. flavéscens** (Pursh) Nutt. (AMERICAN MISTLETOE.) Leaves obovate, glabrous.—On various deciduous trees, chiefly at low altitudes, N. J. and e. Pa. to Fla. and N. Mex., inland in Miss. basin to Mo., s. Ind., and centr. O.

2. ARCEUTHÒBIUM Bieb.

Calyx mostly compressed; the staminate usually 3-parted, the pistillate 2-toothed. Anthers a single orbicular cell, opening by a circular slit. Berry compressed, on a short recurved pedicel.—Parasitic on Conifers, glabrous, with rectangular branches and connate scale-like leaves. (From *ἄρκευθος*, *the juniper*, and *βίος*, *life*.)

1. **A. pusíllum** Peck. (DWARF MISTLETOE.) Very dwarf, the slender scattered or clustered stems 6–20 mm. high, usually simple, olive-green to chestnut; scales obtuse; flowers solitary in most of the axils; fruit narrowly ellipsoid, 2 mm. long. (*Razoumofskya* Ktze.)—On *Picea* and *Larix*, Nfd. and e. Que. to Pa. and n. Mich. (*Wheeler*). Apr., May.—Often causing "witch's brooms" on the host-plant.

ARISTOLOCHIÀCEAE (BIRTHWORT FAMILY)

Twining shrubs, or low herbs, with perfect flowers, the conspicuous lurid calyx valvate in bud and coherent (at least at base) with the 6-celled ovary, which forms a many-seeded 6-celled capsule or berry in fruit. Stamens 5–12, more or less united with the style; anthers adnate, extrorse.—Leaves petioled, mostly heart-shaped and entire. Seeds anatropous, with a large fleshy rhaphe, and a minute embryo in fleshy albumen. A small family of bitter-tonic or stimulant, sometimes aromatic, plants.

1. **Asarum.** Stemless herbs. Stamens 12, with more or less distinct filaments.
2. **Aristolochia.** Caulescent herbs or twining shrubs. Stamens 6, the sessile anthers adnate to the stigma.

1. ÁSARUM [Tourn.] L. Asarabacca. Wild Ginger

Calyx regular; the limb 3-cleft or -parted. Petals 0–3, when present rudimentary, awl-shaped, alternate with the calyx-lobes. Tips of the filaments usually continued beyond the anther into a point. Capsule rather fleshy, globular, bursting irregularly or loculicidal. Seeds large, thick. — Stemless perennial herbs, with aromatic-pungent creeping rootstocks bearing 2 or 3 scales, then one or two kidney-shaped or heart-shaped leaves on long petioles, and a short-peduncled flower close to the ground in the lower axil; in spring. (An ancient name, of obscure derivation.)

§ 1. *Calyx-tube wholly adnate to the ovary, the tips inflexed in bud; filaments slender, much longer than the short anthers; style barely 6-lobed at the summit, with 6 radiating thick stigmas; leaves a single pair, unspotted.*

1. **A. canadénse** L. Soft-pubescent; leaves membranaceous, kidney-shaped, more or less pointed (1–1.5 dm. wide when full grown); calyx bell-shaped, the upper part of the short-pointed lobes more or less spreading, brown-purple inside. — Rich woods; common, especially northw. Var. reflèxum (Bicknell) Robinson. Calyx-segments short, deltoid, early and rather abruptly reflexed. (*A. reflexum* Bicknell.) — Ct., southw. and westw. Var. acuminàtum Ashe. Calyx-segments caudate-acuminate. (*A. acuminatum* Bicknell.) — From Ct. westw.; the commonest form in the prairie states.

§ 2 *Calyx-tube inflated bell- or flask-shaped, its base adnate to the lower half of the ovary; limb 3-cleft, short; anthers sessile or nearly so, oblong-linear; styles 6, fleshy, diverging, 2-cleft, bearing a thick extrorse stigma below the cleft; leaves thickish, persistent, usually only one each year, often whitish-mottled; peduncle very short; rootstocks clustered, ascending.* — Hexastỳlis Raf. (§§ 1 and 2 connect in foreign species.)

2. **A. virgínicum** L. Nearly glabrous; *leaves round-heart-shaped* (about 5 cm. wide); *calyx short, campanulate, about 2 cm. long*, reticulated within; anthers pointless. (*A. minus* Ashe; *Hexastylis virginica* Small.) — W. Va. and Va. to Ga., in the mts.

A. heterophýllum Ashe (with "campanulate" calyx and "oval" seed) and A. Memmingèri Ashe (with "urceolate" calyx and "sharply triangular" seed) cannot be satisfactorily distinguished in the material at hand.

3. **A. grandiflòrum** (Michx.) Small. Closely similar in habit and foliage; *calyx very large, open-campanulate, 2.5–5 cm. long.* (*A. macranthum* Small; *A. Shuttleworthii* Britten; *Hexastylis Shuttleworthii* Small.) — Mts. of Va., Tenn., and N. C.

4. **A. arifòlium** Michx. *Leaves halberd-heart-shaped* (6–15 cm. long); *calyx short-tubular*, with very short and blunt lobes; *anthers obtusely short-pointed.* (*Hexastylis* Small.) — Va. to Fla. and La. A form (not always distinguishable) with a more flask-shaped calyx has been described as *A. Ruthii* Ashe.

2. ARISTOLÒCHIA [Tourn.] L. Birthwort

Calyx tubular; the tube variously inflated above the ovary, mostly contracted; sessile anthers wholly adnate to the short and fleshy 3–6-lobed or -angled style. Capsule naked, septicidally 6-valved. Seeds very flat. — Twining, climbing, or sometimes upright perennial herbs or shrubs, with alternate leaves and lateral or axillary greenish or lurid-purple flowers. (Named from reputed medicinal properties).

* *Calyx-tube bent like the letter S, enlarged at the two ends, the small limb obtusely 3-lobed; low herbs.*

1. **A. Serpentària** L. (Virginia Snakeroot.) Stems (1.2–4.5 dm. high) branched at base, pubescent; *leaves ovate or oblong*, from a heart-shaped base or halberd-form, mostly acute or pointed; flowers all next the root, short-peduncled. — Rich woods, Ct. to Fla., w, to Mich., Mo., and La. July. — The fibrous aromatic-stimulant root is well known in medicine.

Var. **hastàta** (Nutt.) Duchartre. *Leaves narrow, lanceolate or linear-oblong, sagittate or auriculate-hastate.* (*A. hastata* Nutt.; *A. Nashii* Kearney.) — S. C. to Fla. and La.; said to reach our southern limit in Va.

* * *Calyx-tube strongly curved like a Dutch pipe, contracted at the mouth, the short limb obscurely 3-lobed; very tall twining shrubs.*

2. **A. macrophýlla** Lam. (Pipe Vine, Dutchman's Pipe.) *Nearly glabrous; leaves round-kidney-shaped* (sometimes 4 dm. broad); peduncles with a clasping bract; calyx (3 cm. long) with a brown-purple *abrupt flat border.* (*A. Sipho* L'Hér.) — Rich woods, Pa. to Ga., w. to Minn. and Kan. May.

3. **A. tomentòsa** Sims. *Downy or soft-hairy; leaves round-heart-shaped,* very veiny (8–16 cm. long); *calyx yellowish* with an *oblique* dark purple closed *orifice* and a *rugose reflexed limb.* — Rich woods, N. C. to Fla., w. to s. Ill. and Mo. June.

* * * *Calyx-tube straight, open, with ample 6-lobed limb, the lobes appendaged; anthers equidistant; erect herbs; flowers in axillary cymose fascicles.*

4. **A.** Clematìtis L., with long-petioled cordate leaves, sometimes cultivated has become locally established in the Atlantic States from N. Y. to Md. (Introd from Eu.)

POLYGONÀCEAE (Buckwheat Family)

Herbs, with alternate entire leaves, and stipules in the form of sheaths (ocreae, these sometimes obsolete) *above the swollen joints of the stem; the flowers mostly perfect, with a more or less persistent calyx, a 1-celled ovary bearing 2 or 3 styles or stigmas, and a single erect orthotropous seed.* Fruit usually an achene, compressed or 3–4-angled or -winged. Stamens 4–12, inserted on the base of the 3-6-cleft calyx.

* Flowers involucrate; stamens 9; stipules none.

1. **Eriogonum**. Involucre several-flowered, with flowers exserted. Calyx 6-cleft.

* * Flowers without involucre; stamens 4 to 8.

+ Stipular sheaths manifest; ovule erect from the base of the cell.

++ Sepals 4 or 6, the outer row reflexed, the inner erect and enlarging in fruit.

2. **Oxyria**. Sepals 4. Stigmas 2. Achene orbicular-winged. Leaves reniform.
3. **Rumex**. Sepals 6. Stigmas 3. Achene 3-angled.

++ ++ Sepals 5 (sometimes 4), equal and erect in fruit; achene triangular or lenticular.

4. **Polygonum**. Embryo slender, curved around one side of the albumen. Achenes inclosed by the somewhat enlarged fruiting calyx (or exserted in a few species with lanceolate or linear leaves).
5. **Fagopyrum**. Embryo in the albumen, its very broad cotyledons twisted-plaited. Fruit much exserted from the scarcely enlarged calyx. Leaves deltoid, sagittate or hastate.
6. **Polygonella**. Embryo slender, nearly straight. Pedicels solitary. Leaves linear. Plant heath-like.

+ + Stipules obsolete; ovule hanging from the apex of a slender stalk.

7. **Brunnichia**. Calyx 5-parted, in fruit with a wing decurrent on the pedicel. Tendril-climber.

1. ERIÓGONUM Michx.

Flowers perfect, involucrate; involucre 4–8-toothed or -lobed, usually many-flowered; the more or less exserted pedicels intermixed with narrow scarious bracts. Calyx 6-parted or -cleft, colored, persistent about the achene. Stamens 9, upon the base of the calyx. Styles 3; stigmas capitate. Achene triangular. Embryo straight and axial, with foliaceous cotyledons. — Leaves entire, without stipules. (Name from ἔριον, *wool*, and γόνυ, *knee*.)

1. **E. longifòlium** Nutt. Perennial, erect; *leaves* oblanceolate, acute or acutish, canescent beneath, *the lower cuneate at base; sepals* linear, caudate

attenuate, *villous-canescent.* — Sandy woods and barrens, "s. Mo." to Fla and Tex.

2. E. **Allèni** Wats. Perennial, erect; *leaves* oblong, canescent-tomentose beneath, flocculent or glabrate above, *the lower rather abrupt at base;* inflorescence leafy; *sepals* elliptical, yellow, *nearly glabrous.* — Dry soil, mts. of W. Va. and Va.

2. OXÝRIA Hill. Mountain Sorrel

Outer sepals smaller and spreading, the inner broader and erect (but unchanged) in fruit. Stamens 6. Stigmas 2, sessile, tufted. Achene lenticular, thin, flat, much larger than the calyx, surrounded by a broad veiny wing. Embryo straight, in center of the albumen, slender. — Low alpine perennial, with round-kidney-form and long-petioled leaves chiefly from the rootstock, obliquely truncate sheaths, and small greenish to crimson flowers clustered in panicled racemes on a stoutish 1-2-leaved stem. (Name from ὀξύς, *sour*, from the acid leaves.)

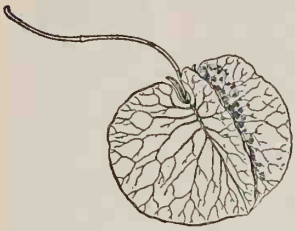
1. O. **dígyna** (L.) Hill. Alpine regions of the White Mts., N. H., and far northw.; Rocky Mts. (Eu.)

3. RÙMEX L. Dock. Sorrel

Calyx of 6 sepals; the 3 outer herbaceous, sometimes united at base, spreading in fruit; the 3 inner larger, somewhat colored (in fruit called *valves*) and convergent over the 3-angled achene, veiny, often bearing a grain-like tubercle on the back. Stamens 6. Styles 3; stigmas tufted. Embryo slightly curved, lying along one side of the albumen, slender. — Coarse herbs, with small and homely (mostly green) flowers, which are crowded and commonly whorled in panicled racemes; the petioles somewhat sheathing at base. (The ancient Latin name; of unknown etymology.)

a. None of the leaves halberd- or arrow-shaped *b.*
  b. Valves entire or denticulate, 3–27 mm. broad *c.*
    c. Grains of fruiting calyx 0, or single and minute, not one third as long as the valves.
      Valves very large, 15–27 mm. broad . . . . . 1. *R. venosus.*
      Valves 4–7 mm. broad.
        Pedicels with tumid joints . . . . . 2. *R. Patientia.*
        Pedicels obscurely jointed . . . . . 3. *R. occidentalis.*
    c. Grains 1–3, well developed, mostly one half to three fourths as long as the valves *d.*
      d. Pedicels filiform, curved or flexuous *e.*
        e. Leaves crisped on the margin.
          Grains chiefly plump and rounded at both ends . . . 5. *R. crispus.*
          Principal grains tapering at summit . . . . . 6. *R. elongatus.*
        e. Leaves flat *f.*
          f. Pedicels with tumid joints, rarely exceeding the coriaceous greenish, straw-colored, or dull brown calyx.
            Grains 3,
              As broad as or broader than the wings of the valves . 7. *R. pallidus.*
              Narrower than the wings . . . . . 8. *R. mexicanus.*
            Grain 1 . . . . . 9. *R. altissimus.*
          f. Pedicels obscurely jointed, mostly exceeding the membranous finally purplish calyx.
            Grains 3 . . . . . 4. *R. Britannica.*
            Grain solitary . . . . . 3. *R. occidentalis.*
      d. Pedicels clavate, deflexed, straightish and slightly rigid, 2–3 times as long as the subacuminate valves . . . . . 10. *R. verticillatus.*
  b. Valves entire or nearly so, scarcely 2 mm. broad, grain-bearing . 11. *R. conglomeratus*
  b. Valves with long sharp salient teeth at least near the base.
    Perennial; pedicels filiform, longer than the subherbaceous valves 12. *R. obtusifolius.*
    Perennial; pedicels thick, shorter than the thickish indurated valves . . . . . 13. *R. pulcher.*
    Annual; teeth of the valves bristle-form . . . . . 14. *R. persicarioides.*
a. Some or all the leaves halberd- or arrow-shaped.
  Valves much exceeding the fruit; leaves arrow-shaped . . . 15. *R. Acetosa.*
  Valves much exceeding the fruit; leaves halberd-shaped . . . 16. *R. hastatulus.*
  Fruit exserted from the minute scarcely changed calyx . . . 17. *R. Acetosella*

§ 1. **LÁPATHUM** [Tourn.] DC. (Dock.) *Flowers perfect or monoeciously polygamous; herbage not sour or scarcely so.* (*Flowering through the summer.*)



691. R. venosus. Fruiting calyx × 1.

1. **R. venòsus** Pursh. Stems from running rootstocks, erect (2-6 dm. high or less), with conspicuous dilated stipules; leaves on short but rather slender petioles, ovate or oblong to lanceolate, acute or acuminate, only the lowest obtuse at base; panicle nearly sessile, short, dense in fruit; *valves entire, without grains, cordate with a deep sinus*, rose-color. — Sask. to centr. Mo., and westw. Fig. 691.

2. **R.** Patiéntia L. (Patience D.) A very tall species, green and glabrous or nearly so, with ovate-oblong and lanceolate leaves (broadest above the base), those from the root 6–9 dm. long and 1–1.5 dm. broad; *pedicels with tumid joints;* one of the heart-shaped nearly or quite entire valves (6 mm. broad) usually bearing *a very small grain, or its midrib merely thickened at base.* — Rich open soil, Nfd. to N. Y. and Pa. (Nat. from Eurasia.) Fig. 692. Var. kúrdicus Boiss. *Grain conspicuous, 2–3 mm. long.* — Mich. to Mo., and westw. (Nat. from Eurasia.)

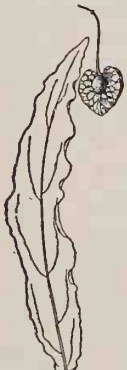
692. R. Patientia. Fruiting calyx × 1.

3. **R. occidentàlis** Wats. Smooth, stout, erect, usually purple-tinged; leaves large, flattish; *pedicels obscurely jointed; valves broadly ovate or orbicular*, somewhat obtusely pointed, often denticulate, 6–9 mm. broad, *all naked or one of them grain-bearing.* — Rich (often brackish) soil, Lab. to Alaska, s to e. Me., Minn., N. Dak., Col., and Cal. Fig. 693.

693. R. occidentalis. Fruiting calyx × 1.

4. **R. Británnica** L. (Great Water D.) Tall and stout (1–2 m. high); leaves oblong-lanceolate, rather acute at both ends, transversely veined, and with obscurely erose-crenulate margins (the lowest, including the petiole, 3–6 dm. long, the middle rarely truncate or obscurely cordate at base); racemes upright in a large compound panicle, nearly leafless; whorls crowded; *pedicels obscurely jointed; valves orbicular or round-ovate*, very obtuse, obscurely heart-shaped at base, *finely reticulated*, entire or repand-denticulate, *all grain-bearing.* — Wet places, Nfd. to N. J., w. to Ont., Minn., and Kan. Fig. 694.

694. R. Britannica. Fruiting calyx × 1.



695. R. crispus. Leaf × ⅓. Fruiting calyx × 1⅔.

5. **R.** crípsus L. (Yellow D.) Smooth, 0.9–1.6 m. high; *leaves with strongly wavy-curled margins, lanceolate*, acute, the lower truncate or scarcely heart-shaped at base; *whorls crowded in prolonged wand-like racemes, leafless above;* pedicels with tumid joints; *valves round-heart-shaped, obscurely denticulate* or entire, 4–6 mm. broad, mostly all grain-bearing; the *grains very plump, subglobose to ellipsoid, with rounded ends.* — In cultivated and waste ground, very common. (Nat. from Eu.) Fig. 695.

6. **R.** elongàtus Guss. Resembling *R. crispus*, and perhaps a variety of it; *grains lance-ovoid, attenuate.* — Widely distr., and becoming common. (Nat. from Eu.)

7. **R. pállidus** Bigel. (White D.) Depressed or ascending; root white; *leaves glaucous, narrowly lanceolate*, or the lowest oblong; the *lowest branches of the dense panicle spreading at nearly right angles;* pedicels much shorter than the *whitish-brown fruiting calyx; valves* deltoid-ovate, 3–4

mm. long, the *tips but slightly exceeding the conspicuous whitish* ovoid or lance-ellipsoid large *grains;* achenes 2–3 mm. long. (*R. salicifolius* Man. ed. 6, in part, not Weinmann.) — Salt marshes, beaches and rocks, coast of N. S., N. B., and N. E. FIG. 696.

696. R. pallidus. Leaf × ⅓. Fruiting calyces × 1⅔

8. R. mexicànus Meisn. Upright; leaves linear-lanceolate to narrowly oblong, pale green or glaucous; *panicle* very dense, its *branches strict or strongly ascending;* pedicels shorter than or sometimes exceeding the *olive- to ruddy-brown* deltoid-ovoid *calyx; valves* 3.5–6 mm. long, *the tips much exceeding the* narrowly ellipsoid to subulate *brown grains;* achenes 1.7–2.3 mm. long. (*R. salicifolius* Man. ed. 6, in part, not Weinmann.) — Rich (often brackish) soil, Lab. and Nfd. to Assina. and B. C., locally s. to centr. Me., Mich., and Mo.; and abundant along the Rocky Mts. to centr. Mex. FIG. 697.

697. R. mexicanus. Fruiting calyx × 1⅔.

9. R. altìssimus Wood. (PALE D.) Rather tall (1–2 m. high); *leaves ovate- or oblong-lanceolate,* acute, pale, thickish, obscurely veiny (the cauline, 7–15 cm. long, contracted at base into a short petiole); racemes spike-like and panicled, nearly leafless; whorls crowded; *pedicels nodding, shorter than the fruiting calyx; valves broadly ovate* or obscurely heart-shaped, obtuse or acutish, entire, loosely reticulated, one with a conspicuous grain, the others with a thickened midrib or naked. — Alluvial soil, Ct. to Neb., and southw. (Mex.) FIG. 698.

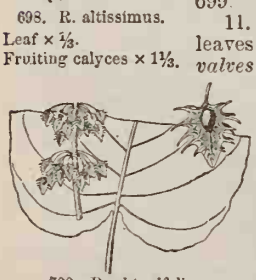
698. R. altissimus. Leaf × ⅓. Fruiting calyces × 1⅓.

10. R. verticillàtus L. (SWAMP D.) Rather tall (1–1.6 m. high); leaves lanceolate or oblong-lanceolate, rather obtuse, thickish, pale green, the lowest often heart-shaped at base; racemes nearly leafless, elongated, loose, the whorls crowded or the lower ones distant; fruit-bearing *pedicels slender, club-shaped, abruptly reflexed, 3–4 times longer than the fruiting calyx; valves dilated-rhomboid, obtusely somewhat pointed, strongly rugose-reticulated,* each bearing a very large grain. — Wet swamps, w. Que. and Vt. to w Ont., and southw. FIG. 699.

699. R. verticillatus. Leaf × ⅓. Fruiting calyces × 1.

11. R. CONGLOMERÀTUS Murr. Smoothish; leaves oblong; panicle leafy; pedicels short; *valves obtuse, subentire, all grain-bearing, the callosities relatively large and conspicuous.* — Va. (*Curtiss* according to Trelease) to S. C.; also Cal. (Adv. from Eu.)

12. R. OBTUSIFÒLIUS L. (BITTER D.) Stem roughish; *lowest leaves ovate-heart-shaped, obtuse,* rather downy on the veins beneath, somewhat wavy-margined, the *upper oblong-lanceolate, acute; whorls loose and distant; valves ovate-halberd-shaped, with some sharp awl-shaped teeth at base,* strongly reticulated. — Fields, roadside ditches, etc., very common. (Nat. from Eu.) FIG. 700.



700. R. obtusifolius. Base of leaf × ⅓. Two whorls of inflorescence × 1. Fruiting calyx × 2⅓.

701. R. pulcher. A bit of inflorescence × 1. Fruiting calyx × 2.

13. R. PULCHER L. *Leaves* oblong, *frequently constricted above the base*, mostly acute; *valves* ovate, many-toothed, soon coriaceous, *very strongly reticulated.* — Ballast grounds, etc., Va. to La.; Cal. (Adv. from Eu.) FIG. 701.

14. R. persicarioides L. (GOLDEN D.) Minutely pubescent, diffusely branched, 2–6 dm. high; leaves lance-linear, wavy-margined, the lower auricled or heart-shaped at base; whorls excessively crowded in leafy and compact or interrupted spikes; *valves rhombic-oblong, lance-pointed, each bearing 2–3 long awn-like bristles on each side*, and a large grain on the back. (*R. maritimus* Man. ed. 6, not L.) — Sea-shore, Que. to N. C.; also in brackish or saline places, Ont. to Ill., and westw. FIG. 702.

702. R. persicarioides. Fruiting calyx × 2.

703. R. Acetosa. Leaf × ½. Fruiting calyx × 2.

§ 2. ACETÒSA [Tourn.] DC. (SORREL.) *Flowers dioecious, small, in a terminal naked panicle; herbage sour; some leaves arrow- or halberd-shaped; smooth perennials, spreading by running rootstocks, flowering in spring.*

15. R. ACETÒSA L. (GARDEN S.) Erect, 3–9 dm. high; *leaves* oblong or broadly lanceolate, *arrow-shaped;* valves rounded at the apex, 4 mm. broad. — Lab. to Pa., and westw.; frequent near Quebec, comparatively local southw. (Nat. from Eu.) FIG. 703.

16. R. hastátulus Baldw. Stem simple, 3–6 dm. high; *leaves* linear or lanceolate, some of them *hastate with divaricate basal lobes;* valves ovate, 2.5 mm. broad. — Sandy soil, near the coast, e. Mass. to Fla. and Tex.; inland in Miss. basin to Ill., Mo., and Kan. FIG. 704.

704. R. hastatulus. Leaf × ½. Fruiting calyces × 2.

17. R. ACETOSÉLLA L. (FIELD OR SHEEP S.) Low (1–3 dm. high); leaves narrow-lanceolate or linear, halberd-form, at least the lowermost, the narrow lobes entire, widely spreading; *pedicels jointed at the summit; sepals scarcely enlarged in fruit, exceeded by the naked achene.* — A common weed. (Nat. from Eu.) FIG. 705.

705. R. Acetosella. Leaf × 1. Fruiting calyx × 2.

4. POLÝGONUM [Tourn.] L. KNOTWEED

Calyx 4–6 (mostly 5)-parted; the divisions often petal-like, all erect in fruit, withering or persistent. Stamens 3–9. Styles or stigmas 2 or 3; achene accordingly lenticular or 3-angular. Embryo placed in a groove on the outside of the albumen and curved halfway around it; the radicle and usually the cotyledons slender. Pedicels jointed. — Ours all herbaceous, with fibrous roots (except in *P. viviparum*), flowering through late summer and early autumn. (Name composed of πολύ-, *many*, and γόνυ, *knee*, from the numerous joints.)

§ 1. AVICULÀRIA Meisn. *Flowers in axillary fascicles or spicate with foliaceous bracts; leaves and bracts jointed upon a very short petiole adnate to the short sheath of the 2-lobed or lacerate scarious stipules; stems striate; calyx 5–6-parted, usually more or less herbaceous; stamens 3–8, the 3 inner*

filaments broad at base; styles 3; *cotyledons incumbent; albumen horny; glabrous annuals, except nos.* 1 *and* 2.

Achenes conspicuously exserted.
- Prostrate, maritime; achene broadly ovoid-pyramidal.
  - Calyx-lobes petaloid, broadly obovate; foliage nearly white . . . . 1. *P. maritimum.*
  - Calyx-lobes subherbaceous, oblong; foliage pale green . . . . . 2. *P. Fowleri.*
- Erect; achene elongated, lanceolate-pyramidal . . . . . 3. *P. exsertum.*

Achenes nearly or quite included by the fruiting calyx.
- Branches terete or nearly so.
  - Flowers small; sepals (normally 5) white or roseate, 1.3–1.8 mm. long; pedicels included.
    - Erect, much branched; leaves linear-oblong, slightly rigid; flowers much surpassed by the bristle-like remnants of the stipules . 4. *P. prolificum.*
    - Prostrate or rarely erect; leaves not firm, bluish green; flowers mostly exserted beyond the hyaline flaccid torn stipules . . 5. *P. aviculare.*
  - Flowers larger, the pedicels exserted; sepals (often 6) 2–3 mm. long.
    - Leaves elliptical, yellowish green, obtuse . . . . . 6. *P. erectum.*
    - Leaves lanceolate, acute . . . . . 7. *P. ramosissimum.*
- Branches rather sharply angled.
  - Leaves strongly plicate; flowers erect . . . . . 8. *P. tenue.*
  - Leaves flat with revolute margins; flowers nodding . . . . 9. *P. Douglasii.*

706. P. maritimum. Flowering branch × 2/3. Fruiting calyx × 3. Stem-leaf × 1.

1. **P. marítimum** L. *Prostrate*, very glaucous, *nearly white; leaves* mostly small, linear-oblong, very thick, usually *exceeding the short internodes;* stipules silvery; *sepals broadly obovate*, petaloid, contracted at the base, the broad roseate tips inclining to spread in fruit. — Sandy sea-coast, Mass. to Fla., local. (Eu.) Fig. 706.

2. **P. Fowlèri** Robinson. *Prostrate, pale green; leaves* narrowly elliptic, *about equaling the full grown internodes; sepals oblong*, herbaceous with white or roseate margin, not contracted at the base, rather closely appressed to the achene. (*P. Rayi* Am. auth., not Babington.) — Sea-coast, e. Canada and Me.; also Wash. to Alaska. Fig. 707.

707. P. Fowleri. Upper part of stem × 2/3. Fruiting calyx × 3.

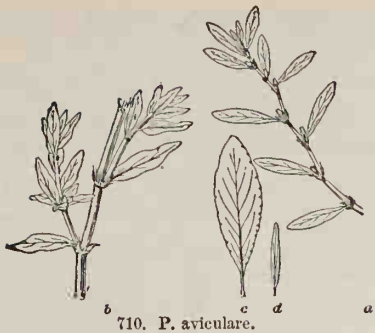
3. **P. exsértum** Small. *Erect* much branched annual, 3–8 dm. high; leaves lanceolate, rather light or pale green, 1–3 cm. long, usually exceeded by the internodes; sepals oblong, green, normally 5, unequal, closely appressed to the base of the *much exserted chestnut-colored ovate-lanceolate achene.* — Brackish meadows, N. B. to N. J.; and on sand-bars and prairies, Ill., Mo., and Neb. to the Saskatchewan. Fig. 708.

708. P. exsertum. Fruiting calyx × 3. Stem leaf × 1/2.

709. P. prolificum. Flowering branches × 1/2.

4. **P. prolíficum** (Small) Robinson. Erect or nearly so, much branched, slightly rigid, 3 dm. high; *leaves linear-oblong*, obtuse or acute, firm, in a dried state veiny; *stipules* soon frayed to bristle-like remnants *surpassing considerably the small sessile* roseate 5-parted *flowers.* (*P. ramosissimum*, var. Small.) — Sea-shore, e. Que. to Va.; also Mo., Neb., and Kan. Fig. 709.

5. **P. aviculàre** L. Slender, *mostly prostrate or ascending, bluish-green;* leaves lanceolate, 6–20 mm. long, usually acute or acutish; *sepals hardly* 2 *mm. long*, green with pinkish margins; stamens 8 (rarely 5); achene dull and minutely granular-striate, mostly included. — Common everywhere in yards, waste places, etc. (Eurasia.) Fig. 710 *a*.



710. P. aviculare.
a. Typical form × ⅔.
b. v. littorale × ⅔.
c. Stem-leaf of v. vegetum × ⅔.
d. Stem-leaf of v. angust. × ⅔.

Var. **littoràle** (Link) Koch. Leaves thick, often obtuse; achenes slightly shining, obscurely punctate or punctate-striate. (*P. littorale* Link.) — A maritime and littoral form sometimes characteristic, but passing to the typical form and separated by no constant character. (Eu.) Fig. 710 *b*.

Var. **végetum** Ledeb. Larger, erect or nearly so; the leaves (often 3 cm. long) oblong or narrowly elliptic, thin, the margins crisped. — Rich soil and in shade. (Eu.) Fig. 710 *c*.

Var. **angustíssimum** Meisn. Leaves linear, 5–9 times as long as broad. — Summit of Mt. Monadnock, N. H., and doubtless elsewhere. (Eu.) Fig. 710 *d*.

711. P. erectum.
Flowering branch × ⅔.

6. **P. eréctum** L. Stout, erect or ascending, yellowish-green; *leaves elliptical*, 1.3–6 *cm. long*, usually obtuse; *flowers yellowish-green*, about 3 mm. long, on more or less exserted pedicels; stamens 5–6; achene dull, included. — Waysides, waste places, etc. Fig. 711.

712. P. ramosissimum.
Fruiting calyx × 3.
Bit of flowering branch × ⅔.
Stem-leaf × ⅔.

7. **P. ramosíssimum** Michx. Erect or ascending, 0.6–1.9 m. high, yellowish-green; *leaves lanceolate* (2–5 cm. long), *acute; sepals* 6, *the* 3 *outer* 2–3 mm. long, *carinate*, cucullate at the summit, drying green with yellow margins; the inner sepals smaller, yellow; stamens 3–6; achene smooth, shining, included. (*P. camporum* of auth. in part, not Meisn.) — Sandy soil, Me. and Mass., local; w. Pa.; Ill. to Minn., Tex., and westw. Fig. 712. Forma ATLÁNTICUM Robinson. Sepals 5 or rarely 6, roseate, not drying yellow, nor even yellowish. — Frequent on the coast, Me. to R. I. In habit identical with the typical western form.

713. P. tenue
Stem-leaf (cut to show plicate nature) × ⅔.

8. **P. ténue** Michx. *Stem angled*, erect (1.5–4 dm. high), glabrous, or slightly scabrous at the nodes; *leaves* narrowly lanceolate to linear, 2–5 cm. long, acute at each end, *strongly plicate;* flowers usually solitary, *nearly sessile, erect;* stamens 8; achene included, dull black. — Dry soil, s. Me. to S. C., w. to Man., Minn., Neb., and Tex. Fig. 713.

714. P. Douglasii.
Stem-leaf × ⅔.

9. **P. Douglàsii** Greene. *Stem angled*, erect; leaves lanceolate to linear, acute at each end, slightly rigid, the margins revolute but the *surface not plicate;* pedicels short but slender; *flowers soon deflexed.* — Rocky or sterile soil, w. Me. to n. N. Y., Ont., and westw., local; common in Rocky Mts. Fig. 714.

§ 2. BISTÓRTA [Tourn.] L. *Glabrous alpine perennials, with thick bulb-like caudex and simple stems; flowers in a spike-like raceme; calyx colored, deeply* 5-*cleft; stamens* 8; *styles* 3, *long.*

10. **P. vivíparum** L. Smooth, dwarf (4–35 cm. high), bearing a linear erect spike of flesh-colored flowers (or often little red bulblets in their place); leaves

lanceolate. — Alpine summits of N. E., shores of L. Superior, Col., and Utah to Alaska and Greenl. (Eurasia.)

§ 3. PERSICÀRIA [Tourn.] L. *Flowers in dense spikes, with small scarious bracts; leaves not jointed on the petiole; sheaths cylindrical, truncate, entire, naked or ciliate-fringed or margined; calyx colored, 5-parted, appressed to the fruit; stamens 4–8; filaments filiform; cotyledons accumbent.*

Sheaths nearly or quite free from ciliation.
  Annual; achene compressed.
    Faces of the achene umbonate; style or stamens exserted — 17. *P. longistylum.*
    Faces of the achene concave; style and stamens included.
      Achene 2.5–2.9 mm. broad.
        Leaves glabrous beneath . . . . . 16. *P. pennsylvanicum.*
        Leaves more or less flocculent-tomentose beneath, or tardily glabrate . . . . . 12. *P. tomentosum.*
      Achene 1.5–2 mm. broad . . . . . 11. *P. lapathifolium.*
  Perennial.
    Spikes several in pedunculate panicles . . . . . 13. *P. densiflorum.*
    Spikes solitary or in pairs.
      Leaves elliptical, obtuse or acute; spikes 1.2–2.4 cm. long; peduncles glabrous or nearly so . . . . . 14. *P. amphibium.*
      Leaves lanceolate or ovate, acuminate; spikes 3–10 cm. long; peduncles hispid, often glandular . . . . . 15. *P. Muhlenbergii.*
Sheaths bristly-ciliate.
  Stem and peduncles glandular-hispid . . . . . 18. *P. Careyi.*
  Stem and peduncles not glandular-hispid.
    Sepals dotted with dark glands.
      Achene dull . . . . . 19. *P. Hydropiper.*
      Achene shining . . . . . 20. *P. acre.*
    Sepals not dark-dotted.
      Annual.
        Leaves ovate; sheaths often with an herbaceous border . 21. *P. orientale.*
        Leaves lanceolate; sheaths without herbaceous border . . 22. *P. Persicaria.*
      Perennial.
        Sheaths with a spreading herbaceous border — (14) *P. amphibium*, v. *Hartwrightii.*
        Sheaths without herbaceous border.
          Appressed-bristly . . . . . 23. *P. setaceum.*
          Finely strigose or smoothish . . . . . 24. *P. hydropiperoides.*

11. **P. lapathifòlium** L. Annual, branching, 0.6–2.4 m. high, *glabrous or the peduncles obsoletely glandular;* leaves lanceolate, attenuate upward from near the cuneate base and acuminate, somewhat scabrous with short appressed hairs on the midrib and margin; sheaths and bracts rarely somewhat ciliolate; *spikes slender* (1–5 cm. long), *somewhat panicled*, dense, erect or nodding; flowers white or pale rose-color; stamens 6; *achene ovate, rarely 2 mm. broad.* (*P. incarnatum* of auth. and ? Ell., the latter merely a robust large-leaved form with long drooping spikes.) — Wet places, common and variable. (Eu.) Var. NODÒSUM (Pers.) Weinmann is a stout form with strongly nodose stems spotted with red dots.

12. **P. tomentòsum** Schrank. Annual, simple or moderately branched, 1–5 dm. high; *leaves lanceolate* or lance-oblong, acute or barely acuminate, *at least the lower retaining more or less flocculent tomentum on the under surface; peduncles distinctly glandular; spikes thickish, the lateral scarcely peduncled; flowers larger and mostly paler than in the last.* — Moist ground, Nfd., e. Canada, and N. E. to Cal. and B. C. (Eu.) Passes to the usually dwarf var. INCÀNUM (Schmidt) Gürke with leaves all permanently white-woolly underneath. (*P. lapathifolium*, var. Koch.) — Sandy shores, sphagnum bogs and occasionally on rubbish heaps, N. E. to N. J. and westw., chiefly along the Great Lakes. (Eu.)

13. **P. densiflòrum** Meisn. Perennial, very stout; leaves lanceolate, attenuate at each end, 2–3 dm. long, 3–6 cm. broad; *spikes* several, *slender*, densely flowered, *rather rigidly erect, paniculate; sheaths turbinate*, much exceeded by the slender pedicels; styles 2; achene dark brown, strongly biconvex, smooth and shining, 1.5 mm. broad. (*P. portoricense* Bertero.) — S. Mo. to S. C., La., and Tex. (Trop. Am.)

14. **P. amphibium** L. Perennial, aquatic or rooting in the mud, glabrous or nearly so, rarely branching above the rooting base; *leaves* usually floating smooth and shining above, *mostly long-petioled, elliptical to oblong* or some

times lanceolate, *obtuse or acutish*, rounded or rarely subcordate at the base (5–12 cm. long); *peduncles glabrous; spike terminal, dense, ovoid or short-cylindric* (1.2–2.4 cm. long); flowers bright rose-color, 3–6 mm. long; the 5 stamens and 2-cleft style exserted. — Lakes and pools, e. Que. to N. J., and westw.; widely distributed and rather common. (Eurasia.) Var. TERRÈSTRE Leers is an erect terrestrial state with narrower acutish shortly petioled leaves scabrous on the margin and often strigose-pubescent; sheaths without herbaceous border. — Occasional with the typical form (also Eu.), and passing in Am. to Var. HARTWRIGHTII (Gray) Bissell with spreading foliaceous borders on the stipular sheaths. (*P. Hartwrightii* Gray.) — An ambiguous plant, sometimes clearly a mere terrestrial and mostly sterile state occurring on the same rootstock as the typical form; but elsewhere seemingly a normal and well marked fertile variety.

15. **P. Muhlenbérgii** (Meisn.) Wats. Perennial, in muddy or dry places, rarely in shallow water, decumbent or suberect, scabrous with short appressed hairs; *leaves lanceolate to ovate, narrowly acuminate* (1–2 dm. long); *peduncles hispid and often glandular; spikes* 3–10 *cm. long*, often in pairs; flowers and fruit nearly as in the last. (*P. emersum* Britton.) — Que. and Me. to Fla., and westw. — Exceedingly variable in foliage and pubescence; aquatic states often have essentially glabrous and cordate leaves, while in plants of drier situations these are sometimes narrowly lanceolate, acute at base, and conspicuously appressed-pubescent on both surfaces.

16. **P. pennsylvánicum** L. *Annual; leaves lanceolate; branches above and especially the peduncles beset with stipitate glands; flowers uniform*, bright rose-color, in short erect spikes, often on exserted pedicels; stamens usually 8; achene nearly orbicular, over 2 mm. broad, at least one surface concave. — Moist soil, in open waste places, centr. Me., westw. and southw. — Neither the stamens nor style conspicuously exserted.

17. **P. longistỳlum** Small. Very like the preceding in habit and foliage; *flowers dimorphous, either the stamens or style conspicuously exserted;* achenes orbicular, shining, both surfaces convex in the middle. — From s. Ill. and Mo. to w. Kan. (*Meehan*), and southw.

18. **P. Carèyi** Olney. Annual, erect, the *stem* (0.6–1.6 m. high) *and peduncles glandular-bristly; leaves narrowly lanceolate*, attenuate to both ends, roughish; sheaths ciliate or sometimes margined; spikes slender, loose and nodding; flowers purplish; *stamens mostly* 5. — Swamps and recent clearings, Me. to N. J., Ont., and Mich.

19. **P. Hydrópiper** L. (COMMON SMARTWEED OF WATER PEPPER.) Annual, 3–6 dm. high, smooth; *leaves* narrowly lanceolate, *very acrid and peppery; spikes nodding*, usually short or interrupted; flowers mostly greenish; *stamens* 6; style 2–3-parted; *achene dull*, minutely striate. — Moist or wet grounds; apparently introduced southeastw., but indigenous northw. and westw. (Eu.)

20. **P. àcre** HBK. (WATER SMARTWEED.) *Perennial*, nearly smooth; stems rooting at the decumbent base, 0.6–1.6 m. high; leaves lanceolate, attenuate, 7–12 cm. long, taper-pointed; *spikes erect, rather dense, distinctly peduncled;* flowers white or flesh-color; *stamens* 8; *style mostly 3-parted; achene smooth and shining.* (*P. punctatum* Ell., including var. *robustius* Small.) — Wet places; e. Mass., westw. and southw. (Trop. Am.)

Var. **leptostàchyum** Meisn. *Annual*, erect or slightly repent at the base, 3–6 dm. high; leaves lanceolate, smaller, thinner, and lighter green than in the type; *spikes elongated and very loosely flowered, not distinctly peduncled*, the widely scattered flowers commonly extending down to the upper leaf-axils. (*P. punctatum*, var. Small.) — Moist ground, common; sometimes well marked, at other times passing imperceptibly into the typical form.

21. **P. ORIENTÀLE** L. (PRINCE'S FEATHER.) Tall branching annual, *soft-hairy; leaves ovate* or oblong, pointed, distinctly petioled; *sheaths* ciliate or *often with an abrupt spreading border;* flowers large, bright rose-color, *in dense cylindrical nodding spikes; stamens* 7. — Sparingly escaped from gardens into waste grounds. (Introd. from India.)

22. **P. PERSICÀRIA** L. (LADY'S THUMB.) Nearly *smooth and glabrous* (3–5 dm. high); sheaths more or less bristly-ciliate; leaves lanceolate, pointed,

roughish, often marked with a dark triangular or lunar spot near the middle; *spikes ovoid or short-cylindric, dense, erect, on smooth* (or at least not glandular) *peduncles;* stamens mostly 6; *styles half 2–3-cleft;* achene gibbous-flattened or sometimes triangular, smooth and shining. — Waste and damp places, very common. (Nat. from Eu.)

23. **P. setàceum** Baldw. *Perennial,* stout, erect from a decumbent and somewhat repent base, *appressed-hirsute;* sheaths fringed with very long coarse bristles; inflorescence and flowers as in the next, the achenes slightly larger, black, shining. — Mo. to S. C., Fla., and Tex. (Asia.)

24. **P. hydropiperoìdes** Michx. (MILD WATER PEPPER.) *Perennial, not acrid;* stem smooth (3–9 dm. high), branching; the narrow *sheaths hairy;* leaves narrowly lanceolate, sometimes oblong; *spikes erect, slender,* sometimes filiform, often interrupted at base (3–6 cm. long); flowers small, flesh-color or nearly white; *sepals not dotted; stamens* 8; *achene sharply triangular, smooth and shining.* (*P. opelousanum* Riddell.) — Wet places and in shallow water, centr. Me., westw. and southw. Var. STRIGÒSUM Small (var. *Macouni* Small) has the stem strigose, and is less frequent throughout our range.

§ 4. TOVÀRA (Adans.) Gray. *Perennials; flowers in loose naked long and slender spikes; calyx rather herbaceous (greenish), unequally 4-parted, stamens 5; styles 2, distinct, rigid and persistent on the smooth lenticular achene.*

25. **P. virginiànum** L. Almost smooth; stem terete, upright (6–12 dm. high); sheaths cylindrical, hairy and fringed; leaves ovate, or the upper ovate-lanceolate, taper-pointed, rounded at the base, short-petioled, rough-ciliate (7–15 cm. long); flowers 1–3 from each bract, somewhat curved, the styles deflexed in fruit, minutely hooked. — Thickets in rich soil, N. H. to Ont., Minn., and southw. (Asia.)

§ 5. ECHINOCAÚLON Meisn. *Erect or reclining annuals, armed with reflex prickles on the angles of the stem, petioles, etc.; flowers capitate or few in a raceme; leaves arrow- or halberd-shaped.*

26. **P. arifòlium** L. (HALBERD-LEAVED TEAR-THUMB.) *Stem grooved-angled; leaves halberd-shaped,* taper-pointed, *long-petioled;* flowers somewhat racemed (few); peduncles glandular-bristly; calyx often 4-parted; *stamens* 6; *styles* 2, very short; *achene lenticular* (large). — Low grounds, N. B. to Ont., s. to Ga., O., and Mich. (Asia.)

27. **P. sagittàtum** L. (ARROW-LEAVED TEAR-THUMB.) *Stem 4-angled; leaves arrow-shaped, short-petioled;* flowers capitate; peduncles smooth; *stamens mostly* 8; *styles* 3, slender; *achene sharply 3-angled.* — Low grounds, common. — Slender, smooth except the angles of the stem and midrib beneath, which are armed with fine and very sharp saw-toothed prickles. (Asia.)

§ 6. TINIÀRIA Meisn. *Twining (except dwarf var. of no. 29), unarmed; leaves ovate-heart-shaped; flowers in panicled racemes; outer calyx-lobes keeled or winged.*

28. **P. CONVÓLVULUS** L. (BLACK BINDWEED.) *Annual,* twining or procumbent, low, *roughish, the joints naked;* leaves halberd-heart-shaped, pointed; flowers in small interrupted corymbose racemes; *outer calyx-lobes keeled* or narrowly winged; achene minutely roughened, dull, black. — Cultivated and waste grounds, common. (Nat. from Eu.)

29. **P. cilinòde** Michx. *Perennial, minutely downy; the sheaths fringed* at the base with reflexed bristles; leaves heart-shaped and slightly halberd-shaped, taper-pointed; racemes panicled; *calyx-lobes obscurely keeled;* achene very smooth and shining. — Copses and rocky hills, e. Que. to mts. of N. C., w. to Minn. and Athabasca. Var. ERÉCTUM Peck (var. *breve* Peck) is a dwarf erect form with the compound racemes chiefly terminal.

30. **P. scándens** L. (CLIMBING FALSE BUCKWHEAT.) *Perennial, smooth; sheaths naked;* leaves heart-shaped or slightly halberd-shaped, pointed; racemes interrupted, leafy; the 3 outer *calyx-lobes strongly keeled and in fruit*

broadly winged, 10–15 mm. long; the wings often crisped, subentire; achene smooth and shining, 4 mm. long. (*P. dumetorum*, var. Gray.) — Moist thickets, common except on our northern borders. — Twining 2–4 m. over bushes. (Japan.)

31. **P. dumetòrum** L. Similar to the preceding; fruiting calyx smaller, 5–7 mm. long; wings subentire; *achene black*, shining, 2.6–3 mm. long. — Woods and rich open places, Mass. to Fla. and Tex., near the coast; inland in Miss. basin. (Eu.) Forma CRISTÀTUM (Engelm. & Gray) Robinson (*P. cristatum* Engelm. & Gray) differs only in having the calyx-wings toothed. — Not rare with and often scarcely distinguishable from the typical form.

§ 7. PLEURÓPTERUS (Turcz.) B. & H. *Erect perennials, unarmed; leaves round-ovate; flowers in panicled racemes.*

32. **P.** CUSPIDÀTUM Sieb. & Zucc. Stout and tall, glabrous except in the loose axillary panicled racemes; leaves round-ovate, shortly acuminate, truncate or cordate at base; outer sepals broadly winged in fruit. (*P. Zuccarinii* Small.) — Occasionally escaped from gardens. (Introd. from Japan.)

5. FAGOPÝRUM [Tourn.] L. BUCKWHEAT

Calyx petal-like, equally 5-parted. Stamens 8. Styles 3; stigmas capitate. Achene 3-sided. Embryo large, in the center of the albumen, which it divides into 2 parts, with very broad and foliaceous plaited and twisted cotyledons. — Annuals, with triangular-heart-shaped or halberd-shaped leaves, semicylindrical sheaths, and corymbose racemes of white, greenish, or rose-colored flowers. (Name from *fagus*, the beech, and πυρός, *wheat*, from the resemblance of the grain to the beech-nut; so the English name Buckwheat, from the German *Buche*, beech.)

1. **F.** ESCULÉNTUM Moench. (BUCKWHEAT.) Smoothish; flower with 8 honey-bearing yellow-glands interposed between the stamens; *achene* acute and entire, *smooth and shining*. (*F. Fagopyrum* Karst.) — Old fields, remaining as a weed after cultivation, and escaping into copses. June–Sept. (Introd. from Eu.)

2. **F.** TATÁRICUM (L.) Gaertn. (INDIA-WHEAT.) Flowers very small, on shorter pedicels; *achene very dull and roughish*, the sides sulcate. — An occasional escape from cultivation, especially in n. N. E. and adjacent Canada. (Introd. from Asia.)

6. POLYGONÉLLA Michx.

Calyx 5-parted, petaloid, loosely persistent about the achene, the 3 inner divisions often enlarging in fruit, in which case the outer are usually spreading. Stamens 8. Styles 3, and achene 3-angular. Embryo slender, straight or nearly so, toward one side of the albumen. — Slender glabrous annuals or perennials, with alternate mostly linear leaves jointed at the base, and rather rigid truncate or oblique naked sheaths or bracts. Flowers on solitary pedicels (nodding in fruit) jointed near the base, borne in slender panicled racemes. (Diminutive of *Polygonum*.)

715. P. articulata. Branch × 1. Bit of fruiting raceme × 1.

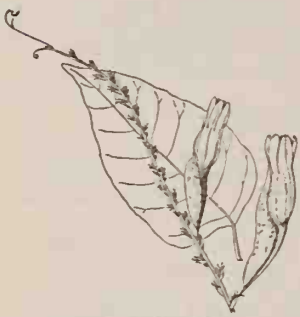
1. **P. articulàta** (L.) Meisn. *Annual*, erect, branching, glaucous, 1–3 dm. high; leaves linear-filiform, deciduous; flowers rose-color or white, nodding, in very slender racemes, *sepals subequal, all erect and connivent about the fruit;* achene exserted, smooth. — Dry sandy soil, Me. and n. N. H. to N. J. and southw.; also in the interior, chiefly in the region of the Great Lakes. — An anomalous species with the calyx of a *Polygonum*. FIG. 715.

716. P. americana. Branch × 1. Bit of fruiting raceme × 1. Fruiting calyx × 2.

2. **P. americàna** (Fisch. & Mey.) Small. *Perennial, frutes-*

cent; leaves linear, persisting; flowers larger; fruit 4 mm. long; the 2 *outer sepals small, at length reflexed.* (*P. ericoides* Engelm. & Gray.) — S Mo. (*Bush*) to Ga. and Tex. Fig. 716

7. BRUNNÍCHIA Banks



717. B. cirrhosa.
Leaf × ½.
Bit of fruiting raceme × 1.

Calyx-divisions somewhat petal-like, oblong, connivent and coriaceous in fruit, the base and almost the whole length of the pedicel winged on one side. Stamens 8; filaments capillary. Styles 3, slender; stigmas depressed-capitate. Ovule pendulous on a slender erect funiculus; seed erect, 6-grooved. Achene obtusely triangular, partly 3-celled, inclosed in the indurated calyx. — Somewhat shrubby, with grooved stems, climbing by tendrils from the ends of the branches. (Named for *M. T. Brünnich*, a Norse naturalist of the 18th century.)

1. **B. cirrhòsa** Gaertn. Leaves ovate, pointed, entire; petioles dilated at base, but with no distinct sheath or stipules; flowers greenish, 2–5 in a fascicle, crowded in axillary and terminal racemes; fruiting calyx with the wing 2.4–2.7 cm. long. — Thickets, s. Ill. and Mo. to Tex., Fla., and S. C. Fig. 717.

CHENOPODIÀCEAE (Goosefoot Family)

Chiefly herbs, of homely aspect, more or less succulent, with mostly alternate leaves and no stipules nor scarious bracts, minute usually greenish flowers, with the free calyx imbricated in the bud, the stamens as many as its lobes, or occasionally fewer, and inserted opposite them or on their base; the 1-celled ovary becoming a 1-seeded thin utricle or rarely an achene. Embryo coiled into a ring around the mealy albumen, when there is any, or else conduplicate, or spiral. Calyx persistent, mostly inclosing the fruit. Styles or stigmas 2, rarely 3–5. — Mostly inert or innocent, weedy plants; several are pot-herbs, such as Spinach and Beet.

* Embryo coiled into a ring about the usually copious central albumen; leaves flat, not spiny, stem not jointed.

+ Flowers perfect (or stamens only occasionally wanting), clustered or panicled; calyx 3–5-toothed or -parted, obvious, persistent; seed-coat crustaceous.

1. **Cycloloma.** Calyx 5-cleft, in fruit surrounded by a horizontal continuous membranaceous wing. Seed horizontal, crustaceous. Leaves sinuate-toothed.
2. **Kochia.** Like no. 1, but wing 5-lobed and seed-coat membranaceous. Leaves entire.
3. **Roubieva.** Calyx 3–5-toothed, becoming saccate and reticulated. Leaves pinnatifid.
4. **Chenopodium.** Calyx 3–5-parted, unchanged or becoming fleshy in fruit.

+ + Flowers monoecious or dioecious; the staminate in clusters, mostly spiked, the calyx 3–5-parted; the pistillate without calyx, inclosed between a pair of appressed axillary bracts.

5. **Atriplex.** Fruiting bracts with margins often dilated and sides often muricate.

+ + + Flowers polygamous, clustered in the axils, 1-sepaled, ebracteolate.

6. **Monolepis.** Annual herb with lanceolate-hastate leaves; fruit a utricle.

+ + + + Flowers perfect, naked or 1-sepaled, solitary in the axils of the reduced upper leaves.

7. **Corispermum.** Pericarp oval, flattened, adherent to the vertical seed. Leaves linear.

** Embryo narrowly horseshoe-shaped or conduplicate; no albumen; stem fleshy, jointed; leaves reduced to opposite fleshy scales or teeth; flowers densely spiked, perfect.

8. **Salicornia.** Flowers sunk in hollows of the axis of the fleshy spike. Calyx utricle-like.

* * * Embryo coiled into a spiral; albumen mostly none; leaves fleshy, alternate.

9. **Suaeda.** Embryo flat-spiral. Calyx wingless. Leaves succulent.

10. **Salsola.** Embryo conical-spiral. Calyx in fruit horizontally winged. Leaves spinescent.

1. CYCLOLÒMA Moq. Winged Pigweed

Flowers perfect or pistillate, bractless. Calyx with the concave lobes strongly keeled, at length appendaged with a broad and continuous horizontal scarious wing. Stamens 5. Styles 3 (rarely 2). — A much branched coarse annual, with alternate sinuate-toothed petioled leaves, and very small scattered sessile flowers in open panicles. (Name composed of κύκλος, *a circle*, and λῶμα, *a border*, from the encircling wing of the calyx.)

718. C. atriplicifolium. Flowering branch × 2/3. Mature flower from above × 1 1/3.

1. **C. atriplicifòlium** (Spreng.) Coult. Diffuse (1.3–5 dm. high), more or less arachnoid-pubescent or glabrate, light green or often deep purple. (*C. platyphyllum* Moq.) — Sandy soil, Man. to s. Ind., Ark., and westw. across the plains; locally introd. eastw. Fig. 718.

2. KÒCHIA Roth.

Characters nearly as in *Cycloloma*, but the seed-coat membranaceous and the albumen wanting. (Named for *W. D. J. Koch*, a German botanist, 1771–1849.)

1. **K.** Scopària (L.) Schrad. Annual, erect, puberulent or glabrate, branching; leaves narrowly lanceolate to linear; flowers in small axillary clusters, sessile; each sepal at length developing a narrow thickish dorsal wing or appendage. — Frequently cultivated for its bright autumnal color; locally established as a weed. (Introd. from Eu.)

3. ROUBIÈVA Moq.

Flowers minute, perfect or pistillate, solitary or 2–3 together in the axils. Calyx urceolate, 3–5-toothed, contracted at the apex and inclosing the fruit. Stamens 5, included; styles 3, exserted. Fruit membranaceous, compressed, glandular-dotted. Seed vertical. Embryo annular. — Perennial glandular herb, with alternate pinnatifid leaves. (Dedicated to *Prof. G. J. Roubieu* of Montpellier.)

1. **R.** multífida (L.) Moq. Prostrate or ascending, branching and leafy leaves lanceolate to linear (1.2–1.8 cm. long), deeply pinnatifid with narrow lobes; fruiting calyx obovate. — Sparingly introduced in the Atlantic States. (Adv. from S. A.)

4. CHENOPODIUM [Tourn.] L. Goosefoot. Pigweed

Flowers all bractless Calyx 5(rarely 4)-parted or -lobed, more or less enveloping the fruit. Stamens mostly 5; filaments filiform. Styles 2, rarely 3 Seed lenticular, horizontal (*i.e.* with its greatest diameter at right angles to the floral axis) or vertical; embryo coiled partly or fully round the mealy albumen. — Weeds, usually with a white mealiness, or glandular. Flowers sessile in small clusters collected in spiked panicles. (Named from χήν, *a goose*, and πούς, *foot*, in allusion to the shape of the leaves.) — Our species are mostly annuals, flowering through late summer and autumn.

a. Glandular, more or less aromatic.
Flowers glomerate; glomerules in bracteate or almost naked spikes 1. *C. ambrosioides.*
Flowers solitary, sessile in open forking cymes, these in loose spikes.
Flowers pubescent; lobes of leaves angled, obtuse . . . 2. *C. Botrys.*
Flowers merely pulverulent-glandular; lobes of leaves not angled, acutish . . . . . 3. *C. incisum.*
a. Not glandular or aromatic, often mealy and heavy-scented *b.*
b. Seeds all vertical; styles filiform, one fourth to one half as long as the diameter of the utricle.
Flowers in glomerules becoming red and berry-like in fruit. . 4. *C. capitatum.*
Flowers spicate, not succulent in fruit . . . . . 5. *C. Bonus-Henricus.*
b. Seeds vertical and horizontal in the same inflorescence; style-branches short.
Leaves bright green, chiefly acute.
Flowers in leafy spikes; seed 1 mm. broad . . . . . 6. *C. rubrum.*
Flowers in axillary glomerules; seed 0.5 mm. broad . . . 7. *C. humile.*
Leaves pale at least beneath, obtuse . . . . . 8. *C. glaucum.*
b. Seeds all horizontal; style-branches short *c.*
c. Pericarp coherent to the surface of the seed *d.*
d. Leaves large, green, sharply few-toothed, abrupt or usually cordate at base . . . . . 9. *C. hybridum.*
d. Leaves small, entire, ovate, about as broad as long, very fetid . 10. *C. Vulvaria.*
d. Leaves longer than broad, cuneate at the base.
Seeds 1.3–1.5 mm. in diameter; flowers glomerate, usually mealy; leaves rhombic, irregularly few-toothed . . 11. *C. album.*
Seeds about 1 mm. in diameter; inflorescence generally loose.
Leaves small, conspicuously mucronate, all entire or the lower 1–3-toothed on each side; plant flowering at the summit . . . . . 12. *C. Berlandieri.*
Leaves rhombic-ovate with several to many acuminate teeth on each side.
Seeds dull; inflorescences short, spreading, axillary, rather loose . . . . . 13. *C. murale.*
Seeds (not pericarp) shining; inflorescences suberect, moniliform . . . . . 14. *C. urbicum.*
Leaves ovate-oblong, entire, not mucronate; plant flowering from the base to the summit . . . . . 15. *C. polyspermum.*
c. Pericarp loose, readily detached from the seed.
Leaves thin, entire or somewhat toothed, scarcely at all mealy 16. *C. Boscianum.*
Leaves entire, linear or nearly so, very mealy at least beneath 17. *C. leptophyllum.*

1. C. AMBROSIOÌDES L. (MEXICAN TEA.) Annual, smoothish; *leaves slightly petioled*, oblong or lanceolate, repand-toothed or nearly entire, the upper tapering to both ends; *spikes densely flowered, leafy*, or intermixed with leaves; fruit perfectly inclosed in the calyx. — Waste places, throughout our range, especially southw. (Nat. from Trop Am.)

Var. ANTHELMÍNTICUM (L.) Gray. (WORMSEED.) Perennial (at least southward); leaves more strongly toothed, the lower sometimes almost laciniate-pinnatifid; *spikes more or less elongated, mostly leafless.* — Same range, sometimes appearing distinct, but all differential characters inconstant. (Nat. from Trop. Am.)

2. C. INCÌSUM Poir. Annual, glandular-pulverulent and aromatic; *leaves sinuate-pinnatifid or -toothed, the lobes ovate-lanceolate, entire or nearly so, acutish;* flowers minute, nearly smooth, in open forking cymes borne in elongated mostly leafy inflorescences. — Thoroughly established and abundant in cultivated fields, North Berwick, Me. (*Parlin*). (Adv. from Trop. Am.)

3. C. BÒTRYS L. (JERUSALEM OAK, FEATHER GERANIUM.) Glandular-pubescent and viscid; *leaves slender-petioled*, oblong, obtuse, sinuate-pinnatifid, *the lobes angled and obtuse; racemes cyme-like, spreading, loose, leafless;* fruit not perfectly inclosed. — Widely introduced. (Nat. from Eu.)

4. C. capitàtum (L.) Asch. (STRAWBERRY BLITE.) Stem ascending, branching; leaves triangular and somewhat halberd-shaped, sinuate-toothed; *clusters simple (large), interruptedly spiked*, the upper leafless; stamens 1–5; *calyx berry-like* in fruit; seed ovoid, flattish, smooth, with a very narrow margin. (*Blitum* L.) — Light soil and newly cleared land, e. Que. to Alaska, s. to N. J., Pa., Ill., Minn., and in the Rocky Mts. — The calyx becomes pulpy and bright red in fruit, when the large clusters look like strawberries. (Eu.)

5. C. BÒNUS-HENRÌCUS L. (GOOD-KING-HENRY.) *Stout, erect* (0.8–3 m. high), mostly simple; *leaves broadly triangular-hastate* (5–12 cm. long), *sub-*

sinuate or entire; flowers somewhat densely paniculate-spiked; seed with obtuse edges.—Sparingly in waste places. (Adv. from Eu.)

6. **C. rùbrum** L. (Coast Blite.) Stem angled, much branched; leaves thickish, triangular-lanceolate, tapering below into a wedge-shaped base and above into a slender point, sparingly and coarsely toothed, the upper linear-lanceolate; *clusters scattered in axillary leafy spikes; calyx-lobes* 2–4, *rather fleshy;* stamens 1–2; *seed* shining, 1 *mm. broad*, the margin acute.—Salt marshes, Nfd. to N. J., and in saline places to Minn. and the Pacific coast. (Eu.)

7. **C. hùmile** Hook. Similar, dwarf; *leaves lanceolate or spatulate*, occasionally hastate; *flowers in axillary glomerules; seed* 0.5 *mm. broad.*—Brackish or saline soil, coast of Me. (*Miss Furbish*); Man. to the Pacific.

8. **C. glaúcum** L. (Oak-leaved G.) *Low, spreading, glaucous-mealy; leaves sinuately pinnatifid-toothed*, oblong, pale green above, *white beneath; clusters in axillary spikes*, small; *seed sharp-edged.*—Waste places. (Nat. from Eu.)

9. **C. hýbridum** L. (Maple-leaved G.) Bright green throughout; stem widely much branched (6–12 dm. high); leaves thin (5–15 cm. long), somewhat triangular and heart-shaped, taper-pointed, *sinuate-angled*, the angles extending into a *few large and pointed teeth;* racemes diffusely and loosely panicled, leafless; calyx not fully covering the fruit, its lobes keeled.—Woods; also frequent in waste places and about cities, centr. Me., westw. and southw.

10. **C. Vulvària** L. Low and spreading, branched from the base; *leaves entire, broadly ovate*, acutish (1 cm. long), *on slender petioles nearly their own length, very fetid* when rubbed or crushed; inflorescences small, scattered.—Waste places, chiefly about cities. (Adv. from Eu.)

11. **C. álbum** L. (Lamb's Quarters, Pigweed.) Erect, *more or less mealy; leaves varying from rhombic-ovate to lanceolate* or the uppermost even linear, acute, *all or only the lower more or less angulate-toothed;* clusters spiked-panicled, mostly dense; calyx (2–2.7 mm. broad) with strongly carinate lobes, nearly or quite covering the seed.—Introduced everywhere. (Nat. from Eu.) Var. víride (L.) Moq. is less mealy and has a less dense inflorescence.—Frequent, especially eastw.

12. **C. Berlandièri** Moq. *Slender*, 3–6 dm. tall; *leaves rhombic and somewhat hastately* 1–*several-toothed* upon each side; the upper leaves elliptical, entire, *mucronate;* inflorescence a loose pyramidal panicle; flowers smaller and less glomerate than in *C. album.*—Ottawa, Ont. (*Macoun*) to Fla. and Mex.—A doubtful species, perhaps only a variety of the preceding.

13. **C. muràle** L. Resembles the preceding, but less erect, loosely branched (3–6 dm. high); *leaves rhombic-ovate*, acute, *coarsely, sharply, and unequally toothed*, thin, bright green; *spikes or racemes diverging, somewhat corymbed;* calyx-lobes scarcely keeled; *seed sharp-edged.*—Waste places. (Adv. from Eu.)

14. **C. úrbicum** L. Rather pale or dull green, nearly destitute of mealiness, with erect branches (3–9 dm. high); *leaves* triangular, acute, *coarsely and sharply many-toothed; spikes erect, crowded in a long and narrow racemose panicle;* calyx-lobes not keeled; *seed with rounded margins.*—Apparently throughout our range. (Nat. from Eu.)

15. **C. polyspérmum** L. Low, often spreading, green and *wholly destitute of mealiness; leaves all entire*, oblong or ovate and on slender petioles; flowers very small, in slender panicles in all the axils, the thin lobes of the calyx very incompletely inclosing the fruit; seed obtuse-edged.—Sparingly naturalized in the Eastern States. (Adv. from Eu.)

16. **C. Bosciànum** Moq. Erect, slender (6–9 dm. high), loosely branched, often *nearly glabrous; leaves oblong- to linear-lanceolate* (3–5 cm. long), attenuate into a *slender petiole*, acute, the lower sinuate-dentate or often all entire; flowers small, solitary or in small clusters upon the slender branchlets; *calyx not strongly carinate.*—Ct. (*Bissell*) to the Great Lakes, s. to N.C. and Tex.

17. **C. leptophýllum** Nutt. *Densely mealy* or sometimes nearly glabrous (2–7 dm. high), simple or branched, often strict; *leaves linear* (1.5–2.5 cm. long), entire, *rather shortly petioled;* flowers closely clustered, in dense or interrupted spikelets; *calyx-lobes strongly carinate.* (*C. album*, var. Moq.)—Near the

coast, Me. to N. J. and Pa.; n. shore of L. Erie; and from w. Wisc. to Col., N. Mex., and westw. Var. OBLONGIFÒLIUM Wats. is a form with somewhat broader oblong or oblong-lanceolate leaves. — S. Me. (*Parlin*); Mo. (*Bush*), and southwestw.

5. ÁTRIPLEX [Tourn.] L. ORACH

Flowers monoecious or dioecious; the staminate like the flowers of *Chenopodium*, but sterile by the abortion of the pistil; the fertile consisting simply of a naked pistil inclosed between a pair of appressed foliaceous bracts, which are enlarged in fruit, and sometimes united. Seed vertical. Embryo coiled into a ring around the albumen. In one section, including the Garden Orach, there are some fertile flowers with a calyx, like the staminate, but without stamens, and with horizontal seeds. — Herbs (ours annuals), usually mealy or scurfy with bran-like scales and with spiked-clustered flowers; in summer and autumn. (The ancient Latin name, a corruption of the Greek, ἀτράφαξις.)

1. A. RÒSEA L. Hoary-mealy; *leaves short-petioled* or the upper sessile, rhombic-ovate or oblong with a wedge-shaped base, *coarsely sinuate-toothed;* fertile flowers mostly clustered in the axils; *fruiting bracts broad, often cut-toothed and warty.* — Sparingly introduced at the East. (Adv. from Eu.)

2. A. pátula L. Erect or prostrate (3–12 dm. high), *glabrous* or somewhat scurfy; *leaves narrowly lanceolate-hastate* (2–10 cm. long), the lower sometimes opposite, *entire or sparingly sinuate-dentate*, petioled, the upper lanceolate to linear; flowers clustered in rather slender spikes, the two kinds together or separate; *fruiting bracts* ovate-triangular or rhombic-hastate, *entire or toothed*, often muricate on the back, united to near the middle. — Nfd. to N. J., Mo., and B. C. (Eu.) Very variable; the marked extremes are: Var. HASTÀTA (L.) Gray. Erect or spreading, stout, at least the lower *leaves broadly triangular-hastate*, often coarsely and irregularly toothed. — Nfd. to Va., Mo., and northwestw., chiefly in saline places and along the Great Lakes. (Eu.) Var. LITTORÀLIS (L.) Gray. Slender; *leaves linear-lanceolate to linear*, rarely subhastate or toothed. — P. E. I. to N. J., and westw. along the Great Lakes.

3. A. arenària Nutt. *Silvery-mealy*, diffusely spreading; *leaves oblong*, narrowed at base, *nearly sessile; fruiting bracts broadly wedge-shaped*, united, 3-nerved, 2–5-*toothed at the summit*, and usually strongly muricate and reticulate on the sides. — Sandy beaches, along the coast, Mass. to Fla.

4. A. argéntea Nutt. Usually low, much branched, *gray-scurfy*, leafy; *leaves deltoid or subrhombic*, often subhastate; staminate flowers in terminal spikes; *fruiting bracts* round-rhombic, indurated, united, the free margins more or less dilated and *deeply toothed*, the sides variously appendaged. — Red River Valley, Minn., southw. and westw.

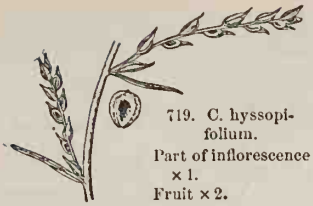
6. MONÓLEPIS Schrad.

Flowers small, glomerate in the upper axils. Sepal 1, green, entire, bract-like, fleshy, obtuse. Utricle moderately flattened. Seed vertical, much compressed. Embryo annular about copious albumen. (Name from μόνος, *one*, and λεπίς, *scale*.)

1. M. Nuttalliàna (R. & S.) Wats. Branched from the base, 0.7–3 dm. high, somewhat fleshy, rather pale green, scarcely or not at all mealy; leaves narrow, slender-petioled, hastate, passing gradually into foliaceous bracts. — Saline and alkaline soil, from the Great Plains westw., extending east to Man., and Minn.; and introd. in Mo.

7. CORISPÉRMUM [A. Juss.] L. BUG-SEED

Calyx of a single delicate sepal on the inner side. Stamens 1 or 2, rarely 5. Styles 2. Fruit oval, flat, with the outer face rather convex and the inner concave, sharp-margined, seed vertical. Embryo slender, coiled around a central albumen. — Low branching annuals, with narrow linear alternate 1-nerved



719. C. hyssopifolium. Part of inflorescence × 1. Fruit × 2.

leaves. (Name formed of κόρις, *a bug*, and σπέρμα, *seed.*)

1. **C. hyssopifòlium** L. Somewhat hairy when young, pale; floral leaves or bracts awl-shaped from a dilated base or the upper ovate and pointed, scarious-margined; fruit wing-margined. — Sandy beaches along the Great Lakes; Mo. to Tex., and northwestw. FIG. 719.

8. SALICÓRNIA [Tourn.] L. GLASSWORT. SAMPHIRE

Flowers perfect, 3 together immersed in each hollow of the thickened upper joints, forming a spike; the two lateral sometimes sterile. Stamens 1 or 2. Styles 2, united at base. Seed vertical, without albumen. Embryo thick, the cotyledous incumbent upon the radicle. — Low saline plants, with succulent leafless jointed stems, and opposite branches; the flower-bearing branchlets forming the spikes. (Name composed of *sal*, salt, and *cornu*, a horn; saline plants with horn-like branches.)

Annuals; middle flower higher than the lateral ones.
- Scales mucronate-pointed and conspicuous, especially when dry . . . . 1. *S. mucronata.*
- Scales blunt or bluntish, inconspicuous.
  - Joints much longer than thick, conspicuously exceeding the middle flower 2. *S. europaea.*
  - Joints about as thick as long, scarcely exceeding the middle flower . . 3. *S. rubra.*

Perennial; flowers nearly equal in height . . . . . 4. *S. ambigua.*

1. **S. mucronàta** Bigel. Unbranched or with strongly ascending simple or slightly forked branches, rather stout (0.5–3 dm. high), turning red in age; *spikes thick, blunt, closely jointed; the joints thicker than long; middle flower half higher than the lateral ones* or less, occupying nearly the whole length of the joint; fruit pubescent; seed 1–1.5 mm. long. (*S. Bigelowii* Torr.) — Salt marshes, N. S. to Fla. and Tex.; also Cal.

2. **S. europaèa** L. Erect (1–4.5 dm. high), from simple to freely branched, the *branches ascending*, green, turning red in autumn; scales obscure and very blunt, making a truncate barely emarginate termination of the long joints of the stem or elongated *slender* (1.5–2.5 *mm. thick*) *tapering spikes; middle flower* much higher than the lateral ones, *shorter than the joint;* fruit pubescent; seed 1.3–2 mm. long. (*S. herbacea* L.) — Salt marshes of the coast, N. B. to Ga.; interior salt springs, N. B. and N. Y.; and on the Pacific coast. (Eurasia.) Var. PACHYSTÀCHYA (Koch) Fernald has the *spikes* much thicker (3–4.5 *mm. thick*). — Similar range, less common. (Eu.)

Var. **prostràta** (Pall.) Fernald. *Branches horizontally spreading or drooping*, very soft and lax, *the lowest much elongated and decumbent;* or the whole plant depressed and matted. — Brackish or alkaline shores, e. Que. to e. Me.; Sask. (Eurasia.)

3. **S. rùbra** Nelson. *Bushy-branched* (0.5–2 dm. high), the abundant simple or forking branches ascending, turning red in autumn; scales broadly triangular, blunt or subacute; spikes slender-cylindric (2–3.5 mm. thick), blunt, rather closely jointed; *flowers crowded, the middle one* higher than the others and *usually reaching the tips of the joints;* fruit pubescent; seed 1 mm. long. — Low alkaline places, Man. and w. Minn. to centr. Kan., and westw. to the Rocky Mts.

4. **S. ambígua** Michx. Numerous tufted stems (1–3 dm. long) decumbent or ascending from a hard and rather *woody creeping base or rootstock*, greenish, turning lead-colored; *spikes slender, short-jointed, the scales short, acutish or acute; flowers nearly equal in height* and equaling the joint; seed pubescent, 0.7 mm. long. — Sea-coast, Mass. to Fla.; also Pacific coast.

9. SUAÈDA Forskål. SEA BLITE

Flowers sessile in the axils of leafy bracts. Calyx 5-parted, fleshy, inclosing the fruit (utricle) and often carinate or crested. Stamens 5. Stigmas 2 or 3.

Seed vertical or horizontal, with a flat-spiral embryo, dividing the scanty albumen (when there is any) into two portions. — Fleshy saline plants, with alternate nearly terete linear leaves. (An Arabic name.) DONDIA Adans.

Leaves linear or slender-cylindric, not broadened at base; plants of Atlantic coast.
  Seed 2 mm. broad . . . . . 1. *S. maritima.*
  Seed 1.2–1.5 mm. broad.
    Sepals rounded (not carinate) on the back . . . . . 2. *S. Richii.*
    Sepals (or some of them) carinate on the back.
      1 or 2 sepals more cucullate-carinate than the others . . . . 3. *S. americana.*
      Sepals equally carinate . . . . . 4. *S. linearis.*
Leaves strongly dilated at base; plants of western plains . . . . 5. *S. depressa.*

1. S. marítima (L.) Dumort. Comparatively low, 0.5–4 (rarely 5 or 6) dm. high, ascending or depressed, subsimple or with spreading-ascending or decumbent subsimple branches, or even forming depressed mats; *leaves usually glaucous, acutish, semicylindric* (*flat above, convex beneath*), 5 cm. or less long; those of the flowering branches shorter, and much exceeding the 1–4 axillary flowers; sepals pale green, rounded or obscurely keeled on the back; seed red-brown or black. (*Dondia* Druce.) — Common on salt marshes, e. Que. to Ct., and occasionally southw. to La. Fr., June–Sept. (Eu.)

2. S. Ríchii Fernald. Stems *procumbent*, forming mats 5 dm. or less across (sometimes fruiting when 1 cm. long); *leaves dark green, not glaucous, subcylindric, dorsally compressed, obtuse*, the lower 1.5 cm. or less in length; those of the flowering branches broader and shorter (4–5 mm. long); seed black. — Salt marshes and wet sand, coast of N. S. and Me. Fr., July–Sept.

3. S. americàna (Pers.) Fernald. Stems *procumbent*, the branches 2 or 3 dm. long, only the abundant *densely flowered spiciform ultimate branches* ascending; *leaves linear, thickish* (*flat above*), *acute*, the lower about 2 cm. long, those subtending the crowded flowers broader and shorter; *sepals very irregular*, 1 or 2 strongly keeled. (*Salsola salsa*, var. Pers.) — Salt marshes, lower St. Lawrence R. to s. Me. Fr., late Sept.–Nov. — Mature plant purplish throughout.

4. S. lineàris (Ell.) Moq. *Erect or ascending*, 2–9 dm. high, profusely branched; the *slender branches ascending or wide-spread, not procumbent;* leaves narrowly linear, acute, deep green, not glaucous, the lower 4 cm. or less long, the upper similar but shorter; sepals equally carinate. (*Dondia americana* Britton, not *Salsola salsa*, var. *americana* Pers.) — Sandy coast, Me. to Tex. Fr., Sept.–Nov.

5. S. depréssa (Pursh) Wats. *Decumbent* or erect, branching from the base; *leaves broadest at base*, the cauline 1–4 cm. long, the floral lanceolate to ovate; one or more of the calyx-lobes *very strongly carinate or crested.* (*Dondia* Britton.) — Saline soil, Man. and w. Minn. to Neb., and westw. across the plains.

10. SÁLSOLA L. SALTWORT

Flowers perfect, with 2 bractlets. Calyx 5-parted, its divisions at length horizontally winged on the back, the wings forming a broad scarious border. Stamens mostly 5. Styles 2. Seed horizontal, without albumen. — Herbs or slightly shrubby branching plants with fleshy and rather terete or awl-shaped leaves and sessile axillary flowers. (Diminutive of *salsus*, salty, alluding to the saline habitat of most of the species.)

1. S. Kàli L. (COMMON S.) Annual, diffusely branching, bushy, *pubescent* (rarely glabrous); *leaves* all alternate, *awl-shaped, stiffish, prickly-pointed;* flowers single; calyx with converging lobes forming a sort of beak over the fruit, the yellowish to lead-colored wings nearly orbicular and spreading. — Sandy sea-shore, Nfd. to Ga., and saline places inland. Aug. (Eu.) Var. CAROLINIÀNA (Walt.) Nutt. *Glabrous* throughout (rarely pubescent); the wings larger, roseate. — Similar range. (Eu.)

Var. TENUIFÒLIA G. F. W. Mey. (RUSSIAN THISTLE.) Erect or ascending, very bushy; *leaves* especially on the young and vegetative stems *longer* (3–7 cm.

in length), more slender, *filiform;* flowers somewhat variable but apparently showing no constant difference from those of the typical form. (*S. Tragus* of auth., but scarcely of L.) — A weed of recent introduction, exceedingly abundant and pernicious in the Northwestern States; also locally established eastw. (Nat. from Asia.)

AMARANTHÀCEAE (Amaranth Family)

Weedy herbs, with nearly the characters of the preceding family, but the flowers mostly imbricated with dry and scarious persistent bracts; these often colored, commonly 3 in number. — The greater part of the family tropical.

* Anthers 2-celled; leaves alternate.

+ Ovary 1-ovuled; filaments separate and distinct.

1. **Amaranthus.** Flowers monoecious or polygamous, all with a calyx of 5 or sometimes 3 distinct erect sepals, not falling off with the fruit.
2. **Acnida.** Flowers dioecious. Calyx none in the fertile flowers.

+ + Ovary 2–8-ovuled; filaments united at base.

3. **Celosia.** Flowers perfect. Calyx 5-parted.

* * Anthers 1-celled; leaves opposite.

4. **Iresine.** Calyx of 5 sepals. Filaments united below into a cup. Flowers paniculate.
5. **Froelichia.** Calyx 5-cleft. Filaments united into a tube. Flowers spicate.
6. **Gomphrena.** Calyx of 5 sepals or 5-cleft. Filaments united into an elongate tube. Flowers capitate.

1. AMARÁNTHUS [Tourn.] L. Amaranth

Flowers 3-bracted. Calyx glabrous. Stamens 5, rarely 2 or 3, separate; anthers 2-celled. Stigmas 2 or 3. Fruit an ovoid 1-seeded utricle, 2–3-beaked at the apex, mostly longer than the calyx, opening transversely or sometimes bursting irregularly. Embryo coiled into a ring around the albumen. — Coarse annual weeds, with alternate and entire petioled setosely tipped leaves, and small green or purplish flowers in axillary or terminal spiked clusters; in late summer and autumn. (Ἀμάραντος, *unfading*, because the dry calyx and bracts do not wither.)

§ 1. *Utricle thin, circumscissile, the top falling away as a lid; flowers polygamous.*

* *Flowers in terminal and axillary simple or mostly panicled spikes; stem erect* (0.3–2 *m. high*); *leaves long-petioled; stamens and sepals* 5.

+ *Sepals spatulate.*

1. A. Palmèri Wats. Erect; leaves ovate, long-petioled; *spikes*, especially the terminal, *very long* (1–3 dm.); *sepals somewhat unguiculate;* bracts pungent. — By railroads and about towns, Mo. and Kan.; and locally, e. Mass. (Adv. from the S. W.)

+ + *Sepals ovate-lanceolate to oblong.*

2. A. retroflèxus L. (Green A., Pigweed.) Roughish and more or less pubescent; leaves dull green, long-petioled, ovate or rhombic-ovate, undulate; the *thick spikes* crowded in a stiff *glomerate panicle; bracts awn-pointed*, rigid, exceeding the acute or obtuse sepals. — Cultivated grounds, common; indigenous southwestw. (Adv. from Trop. Am.)

3. A. hýbridus L. (Green A., Pigweed.) Similar, but smoother and deeper green, with more *slender-cylindric* more or less *flexuous spikes*, the lateral ones spreading; *bracts* rather *long-awned*, and sepals acute or acuminate. (*A. chlorostachys* Willd.) — Cultivated grounds, common. (Nat. from Trop. Am.) Forma hypochondrìacus (L.) Robinson. (Prince's Feather.) Leaves, bracts, and flowers purple-tinged or livid. (*A. hypochondriacus* L.) — Sometimes cultivated, and occasionally found on waste ground. — It is to be

distinguished from the following species chiefly by its smoother character, thicker spikes, and longer-awned bracts.

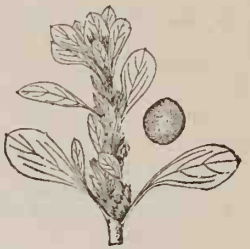
4. **A.** PANICULÀTUS L. (PURPLE A.) Stem mostly pubescent; leaves oblong-ovate or ovate-lanceolate; *spikes long, numerous and slender, panicled*, spreading; *bracts merely awn-pointed;* flowers small, green tinged with red, or sometimes crimson; *fruit 2–3-toothed* at the apex, longer than the calyx. (*A. hybridus*, var. Uline & Bray.) — Roadsides, etc. (Adv. from Trop. Am.)

* * *Flowers crowded in close and small axillary clusters; stems low, spreading or ascending; stamens and sepals* 3, *or the former only* 2.

720. A. graecizans ×⅔.

5. **A. graecìzans** L. (TUMBLE WEED.) Smooth, pale green; *stems whitish, erect or ascending*, diffusely branched; leaves small, obovate and spatulate-oblong, very obtuse or retuse; flowers greenish; sepals acuminate, half the length of the *rugose fruit*, much shorter than the *subulate rigid pungently pointed bracts; seed small*, 0.8 mm. broad. (*A. albus* L.) — Waste grounds, common. FIG. 720.

6. **A. blitoìdes** Wats. Like the last, but *prostrate or decumbent;* spikelets usually contracted; *bracts ovate-oblong, shortly acuminate;* sepals obtuse or acute; *fruit not rugose; seed about* 1.5 *mm. broad.* — From Minn. to Mo., Tex., and westw.; also introduced eastw., chiefly on railroad ballast. FIG. 721.



721. A. blitoides. Tip of branch ×⅔ Seed ×4.

§ 2. *Utricle thinnish, bursting or imperfectly circumscissile; flowers monoecious.*

7. **A.** SPINÒSUS L. (THORNY A.) Smooth, bushy-branched; stem reddish; leaves rhombic-ovate or ovate-lanceolate, dull green, a pair of *spines in their axils;* upper clusters sterile, forming long and slender spikes; the fertile globular and mostly in the axils; flowers yellowish-green, small. — Waste grounds, Me. to Minn., and southw. (Nat. from Trop. Am.)

§ 3. EÙXOLUS (Raf.) Gray. *Utricle remaining closed or bursting irregularly; no spines; bracts inconspicuous.*

* *Leaves relatively large* (2–3 *cm. in breadth*).

722. A. lividus. Calyx and utricle ×3.

8. **A.** LÍVIDUS L. Stem fleshy, red; leaves emarginate, ovate or obovate, 2–4 cm. long, on petioles two thirds as long; bracts very short; *utricle thin, smooth.* — About Atlantic ports, not very common. FIG. 722. (Adv. from Trop. Am.)

9. **A.** VÍRIDIS L. Similar, but with a *warty utricle.* — About Atlantic ports; also reported in O. FIG. 723. (Adv. from Trop. Am.)

723. A. viridis. Calyx and utricle ×3.

* * *Leaves smaller.*

10. **A. pùmilus** Raf. Low or prostrate; *leaves fleshy* and *obovate*, emarginate, strongly nerved; *flower-clusters small and axillary; stamens and sepals* 5, the latter half the length of the obscurely 5-ribbed fruit. — Sandy beaches, R. I. to N. C.

11. A. DEFLÉXUS L. Low, spreading; *leaves ovate, thin, flat;* spikes chiefly terminal, thickish, bluntly cordate; utricle ovoid, smooth, 5-nerved, much longer than the sepals. — Waste land near the larger Atlantic ports. (Adv. from Eu.)

12. A. CRÍSPUS (Lesp. & Thév.) A. Br. Very slender, procumbent, pubescent; *leaves* small, light green, *rhombic-ovate to -lanceolate*, acute, the margin *crisped* and undulate; flowers in small axillary clusters; bracts and sepals scarious, oblanceolate, acute or obtuse; utricle about as long, roughened, neither

nerved nor angled. — Streets of Albany, New York City, and Brooklyn; doubtless introduced, but the native habitat unknown.

2. ACNÌDA L. Water Hemp

Habit of *Amaranthus*. Bracts 1–3, unequal. Staminate calyx of 5 thin oblong mucronate-tipped sepals, longer than the bracts; stamens 5, the anther-cells united only at the middle. Stigmas 2–5, often long and plumose-hispid. Fruit somewhat coriaceous and indehiscent, or a thin membranous utricle dehiscing irregularly (rarely circumscissile), usually 3–5-angled. (Name from α- privative, and κνίδη, *a nettle*.)

* *Fruit indehiscent, with firm and close pericarp; salt-marsh plants.*

1. **A. cannabìna** L. Usually stout, 1–2 m. high or more, glabrous; leaves lanceolate to linear-lanceolate, acuminate, long-petioled; sepals of sterile flowers ovate-oblong, obtuse or acutish; bracts usually thin, lax, and much shorter than the fruit, sometimes more rigid and longer; fruit about 3 mm. long, obovoid; seed usually less than 3 mm. long, shining. (*A. rusocarpa* Michx.) — Salt or brackish marshes, coast of N. H. to Fla.

* * *Fruit dehiscing irregularly, the pericarp thin, loose and usually roughened; not salt-marsh plants.*

2. **A. tuberculàta** Moq. Tall and erect, with flexuous branches; leaves lanceolate to rhombic-ovate, acute or acutish; sepals of sterile flowers lanceolate, acute or acuminate; pistillate flowers closely clustered in more or less dense naked or leafy axillary and terminal spikes (or the axillary capitate); bracts rather rigid, acuminate, equaling or exceeding the fruit; utricle about 1 mm. long; seed shining, 0.7 mm. in diameter. (*A. tamariscina*, var. Uline & Bray.) — Vt. and Mass. (*Ammidown*) to Dak. and La.

Var. **subnùda** Wats. Often decumbent; leaves smaller, obtusish; flowers aggregated into distinct globose glomerules (7–15 mm. in diameter). (*A. tamariscina*, var. *concatenata* Uline & Bray, not *A. cannabina*, var. *concatenata* Moq.) — Sandy bottom lands, w. Que. to Wisc. and Mo. — Passing into the typical form.

Var. **prostràta** (Uline & Bray) Robinson. Prostrate, much branched; leaves (1–2 cm. long, 3–10 mm. broad) and glomerules (4–6 mm. in diameter) small. (*A. tamariscina*, var. Uline & Bray.) — Similar situations, w. Que. to Minn., and southw.

* * * *Fruit regularly circumscissile; western.*

3. **A. tamariscìna** (Nutt.) Wood. With the habit of the preceding species but readily distinguished by the fruit. (*Amaranthus* Nutt.) — Prairies, etc., "Dak." to Tex. and N. Mex.; said to occur as far e. as Ill.

3. CELÒSIA L

Flowers subtended by a bract and two bractlets. Calyx scarious, in fruit erect and (in our species) concealing the utricle. Stamens 5. Fruit a thin membranaceous utricle, circumscissile or dehiscing irregularly, ovoid or subglobose. (Name from κήλεος, *a burning*, on account of the seared appearance of the flowers.)

1. **C. argéntea** L. Erect glabrous herb, 3–12 dm. tall; leaves lanceolate, short-petioled, acute; inflorescence a simple dense cylindrical spike; sepals white or roseate-tinged, much longer than the bracts; style conspicuous, exserted. — Montgomery Co., Pa. (*Porter*). (Adv. from the Tropics.)

4. IRESÌNE P. Br.

Flowers mostly polygamous or dioecious, 3-bracted. Calyx of 5 sepals. Stamens mostly 5. Fruit a globular utricle, not opening. — Herbs, with opposite petioled leaves, and minute scarious-white flowers crowded into clusters or

spiked and branching panicles; the calyx, etc., often bearing long wool (whence the name, from *εἰρεσιώνη*, a wreath or staff entwined with fillets of wool).

1. **I. paniculàta** (L.) Ktze. Nearly glabrous, annual, erect, slender (6–12 dm. high); leaves ovate-lanceolate; panicles very slender, often broad and diffuse, naked; bracts and calyx silvery-white, the fertile calyx twice longer than the broad bracts and densely silky-villous at base. (*I. celosioides* L.) — Dry banks, O. to Kan., and far southw. Sept. (Trop. regions.)

5. FROELÍCHIA Moench.

Flowers perfect, 3-bracted. Calyx tubular, 5-cleft at the summit, below 2–5-crested lengthwise, or tubercled and indurated in fruit, inclosing the indehiscent thin utricle. Filaments united into a tube, bearing 5 oblong 1-celled anthers, and as many sterile strap-shaped appendages. — Hairy or woolly herbs, with opposite sessile leaves, and spiked scarious-bracted flowers. (Named for *Joseph Aloys Froelich*, a German botanist, 1766–1841.)

1. **F. floridàna** (Nutt.) Moq. Root annual; stem leafless above (0.3–1.5 m. high); leaves lanceolate, silky-downy beneath; spikelets crowded into an interrupted spike; calyx very woolly, becoming broadly winged, the *wings irregularly toothed*. (Including *F. campestris* Small.) — Dry sandy places, Del. to Fla.; and from Ill. to Minn., southw. and westw.

2. **F. grácilis** Moq. More slender, with narrow leaves, the spikelets smaller, and the *crests* of the matured calyx *of nearly distinct rigid processes*. — Prairies of Kan. and Neb. to Col. and Tex.

6. GOMPHRÈNA L.

Flowers perfect, subtended by a bract and two bractlets. Calyx often lanate at the base, its segments more or less unequal, sessile between the bractlets. Fruit a compressed ovoid 1-ovuled utricle. Seed inverted, suspended by a long funicle from the apex of the utricle. — Erect or prostrate herbs, generally rough-pubescent and with swollen nodes. (Altered from *Gromphaena*, the classical name of some related plant, probably *Amaranthus tricolor*, from *γράφειν*, *to write* or *to paint*, in allusion to the variegated leaves.)

1. **G. globòsa** L. (Globe Amaranth, Immortelle.) A low branching pubescent annual with oblong nearly sessile leaves; flowers in dense round heads, crimson, rose-color, or white. — Common in cultivation, and occasionally escaping to roadsides, etc., O. (*Gleason*). (Introd. from Trop. Asia.)

PHYTOLACCÀCEAE (Pokeweed Family)

Plants with alternate entire leaves and perfect flowers, having the general characters of Chenopodiaceae, *but usually a several-celled ovary composed of as many carpels united in a ring, and forming a berry in fruit.*

PHYTOLÁCCA [Tourn.] L. Pokeweed

Calyx of 5 rounded and petal-like sepals. Stamens 5–30. Ovary of 5–12 carpels united in a ring, with as many short separate styles, in fruit forming a depressed-globose 5–12-celled berry, with a single vertical seed in each cell. Embryo curved in a ring around the albumen. — Tall and stout perennial herbs, with large petioled leaves, and terminal racemes which become lateral and opposite the leaves. (Name compounded of *φυτόν*, *plant*, and the French *lac*, lake, in allusion to the crimson coloring matter which the berries yield.)

1. **P. decándra** L. (Common Poke or Scoke, Garget, Pigeon Berry.) A smooth plant, with a rather unpleasant odor, and a very large poisonous root (often 1–1.5 dm. in diameter) sending up stout stalks at length 2–3 m. high; calyx white; stamens and styles 10; ovary green; berries in long racemes,

dark-purple, ripe in autumn. — Low grounds and rich soil, s. Me. to Ont., Minn., and southw. July–Sept.

NYCTAGINÀCEAE (Four-o'clock Family)

Herbs (or in the tropics often shrubs or trees), with mostly opposite and entire leaves, stems tumid at the joints, a delicate tubular or funnel-form calyx which is colored like a corolla, its persistent base constricted above the 1-celled 1-seeded ovary and indurated into a sort of nut-like pericarp; the stamens few, slender, and hypogynous; the embryo coiled around the outside of mealy albumen, with broad foliaceous cotyledons (in *Abronia* monocotyledonous by abortion). — Represented in our gardens by the Four-o'clock or Marvel of Peru (Mirábilis Jalàpa), in which the calyx is commonly mistaken for a corolla. the cup-like involucre of each flower exactly imitating a calyx.

1. OXÝBAPHUS L'Hér.

Flowers 3–5 in the same 5-lobed membranaceous broad and open involucre, which enlarges and is thin and reticulated in fruit. Calyx with a very short tube and a bell-shaped (rose or purple) deciduous limb, plaited in the bud. Stamens mostly 3 (3–5), hypogynous. Style filiform; stigma capitate. Fruit achene-like, several-ribbed or angled (pubescent in ours). — Herbs, abounding on the western plains, with very large and thick perennial roots, opposite leaves, and mostly clustered small flowers. (Name ὀξυβάφον, *a vinegar-saucer*, or small shallow vessel; from the shape of the involucre.) Allionia Loefl.

* *Leaves all petioled except the uppermost reduced ones.*

1. **O. nyctagíneus** (Michx.) Sweet. Nearly smooth; stem becoming repeatedly forked, 0.3–1.5 m. high; *leaves broadly ovate, cordate;* inflorescence but slightly pubescent; *pedicels* slender, *becoming* 1 *cm. in length*, the lower axillary, solitary, the upper crowded upon short floral axes; involucres at length very large, 2 cm. in diameter; fruit cylindric-obovoid, 4 mm. in length, rather acutely angled. — Man., Minn., and Wisc. to Tex. and La.; also introd. eastw. — The leaves vary to oblong or ovate-lanceolate and abrupt or even cuneate at the base.

2. **O. floribúndus** Chois. Similar but with mostly narrower *ovate to oblong leaves* (*not cordate*); involucres smaller and more numerous, glomerate upon the elongated branches of an open cymose panicle; *pedicels* short, *seldom over* 6 *mm. in length.* (*O. nyctagineus*, var. *oblongifolius* Gray; *Allionia ovata* Pursh, not *O. ovatus* Vahl.) — "O.," Mo. (*Bush*), southwestw. and northwestw.

* * *Leaves sessile or nearly so.*

3. **O. hirsùtus** (Pursh) Sweet. More or less *glandular-hirsute*, especially about the nodes and the usually contracted inflorescence, 3–9 dm. high; *leaves lanceolate to linear-lanceolate, sessile* and cuneate at base or narrowed to a short petiole; stamens often 5; fruit with thickened obtuse angles. (*Allionia* Pursh; *A. bracteata* Rydb.; *Calymenia pilosa* Nutt.?) — Plains of the Sask. to Tex., Wisc., O. (*Louth*), and casual eastw. in N. Y. and Ct.

4. **O. álbidus** (Walt.) Sweet. Similar but *smoother;* stem whitish; *leaves oblong*, elongated, obtuse; flowers in weak individuals few, axillary, in stronger ones numerous in a terminal panicle. (*Allionia* Walt.; *A. lanceolata* Rydb.) — Kan. and Mo., S. C. and Tex; occasionally adventive northeastw.

5. **O. lineàris** (Pursh) Robinson. Often tall, *glabrous* except the more or less hirsute peduncles and involucres; *leaves linear*, thick and glaucous, often elongated, 5–15 cm. long. (*O. angustifolius* Sweet; *Allionia linearis* Pursh; also *A. Bushi* Britton, a low form.) — Minn. to Mo., Tex., westw. and northwestw.; established on sandy ground, North Haven, Ct. (*Evans*).

ILLECEBRÀCEAE (Knotwort Family)

Herbs, with mostly opposite and entire leaves, scarious stipules (except in *Scleranthus*), *a* 4–5-*toothed or -parted herbaceous or coriaceous persistent calyx, stamens borne on the calyx, as many as the lobes and opposite them or fewer, styles* 2 *and often united, and fruit a* 1-*seeded utricle.* Seed upon a basal funicle, the embryo (in ours) surrounding the mealy albumen. — Small diffuse or tufted herbs, with small greenish or whitish flowers in clusters, or dichotomous cymes, with petals minute or none.

1. **Scleranthus.** Stamens borne on the throat of the indurated 5-cleft and pointless calyx. Styles 2. Stipules none.
2. **Anychia.** Stamens on the base of the 5-parted awnless calyx. Styles hardly any.
3. **Paronychia.** Stamens on the base of the 5-parted calyx; the sepals hooded at the summit and bristle-pointed. Style 1, 2-cleft at the top.

1. SCLERÀNTHUS L. Knawel

Sepals 5, united below into an indurated cup, inclosing the utricle. Stamens 10 or 5. Styles 2, distinct. — Homely little weeds, with awl-shaped leaves, obscure greenish clustered flowers, and no stipules. (Name from σκληρός, *hard*, and ἄνθος, *flower*, from the hardened calyx-tube.)

1. **S.** ánnuus L. Much branched, spreading (7–12 cm. high); flowers sessile in the forks; calyx-lobes scarcely margined. — Waste places and roadsides. (Nat. from Eu.)

2. ANÝCHIA Michx. Forked Chickweed

Sepals 5, scarcely concave, indistinctly mucronate on the back, greenish. Stamens 2–3, rarely 5. Stigmas 2, sessile. Utricle larger than the calyx. Radicle turned downward. — Small many times forked annuals, with small stipules; the minute flowers in the forks, produced all summer. (A contracted derivative of *Paronychia.*)

1. **A.** polygonoìdes Raf. *More or less pubescent, short-jointed, low and spreading;* leaves somewhat petioled, mostly very narrowly lanceolate or oblanceolate; flowers nearly sessile and somewhat clustered. (*A. dichotoma* Man. ed. 6, not Michx.) — Mostly in open places, N. E. to Fla., w. to Minn. and Ark

2. **A.** canadénsis (L.) BSP. *Smooth, longer-jointed, slender and erect; leaves thinner, broader and longer* (1–3 cm. long); flowers more stalked and inflorescence diffuse. (*A. dichotoma* Michx.; *A. capillacea* DC.) — Dry woodlands through nearly the same range; more abundant northw., and extending w. to Neb.

3. PARONÝCHIA [Tourn.] Adans. Whitlow-wort

Sepals 5, linear or oblong, concave, awned at the apex. Petals (or staminodia) bristle-form, or minute teeth, or none. Stamens 5. Style 2-cleft at the apex. Utricle inclosed in the calyx. Radicle ascending. — Tufted herbs (ours perennial), with dry and silvery stipules, and clustered flowers. (Greek name for a *whitlow*, and for a plant thought to cure it.)

1. **P.** argyrócoma (Michx.) Nutt. Forming broad tufts, freely branched, *few of the branches fertile; leaves* linear, *flat, permanently silky;* inflorescence densely cymose, surrounded by conspicuous large silvery bracts; calyx hairy, short-awned, the *awns flattish and usually hairy;* petals mere teeth between the stamens. — Rocky slopes among the mts., w. Va. to Tenn. and Ga.

Var. albimontàna Fernald. *Branches mostly floriferous; leaves glabrate, the margins involute;* cymes mostly lax; calyx usually longer, the *awns subulate, glabrescent.* — Bare mountain slopes, w. Me. and N. H.; and locally by the Merrimac R., Newburyport, Mass.

2. **P. dichótoma** (L.) Nutt. Smooth, tufted; *stems* (1.5–3 dm. high) *ascending* from a rather woody base; *leaves* (1.2–3.6 cm. long) *and bracts narrowly awl-shaped; cymes open, repeatedly forked;* sepals short-pointed; minute bristles in place of petals. — Rocks, Md. to N. C. and Tex. July–Sept.

AIZOÀCEAE

A miscellaneous group, *chiefly of fleshy or succulent plants, with mostly opposite leaves and no stipules.* Differing from *Caryophyllaceae* and *Portulacaceae* by having the ovary and capsule 2–several-celled, and the stamens and petals sometimes numerous, as in *Cactaceae* (but the latter wanting in most of the genera). Seeds with the slender embryo curved about mealy albumen. Our genera apetalous and with the calyx free from the ovary.

1. **Sesuvium.** Calyx-lobes 5, petaloid. Stamens 5–60. Capsule circumscissile. Succulent.
2. **Mollugo.** Sepals 5. Stamens 3 or 5. Capsule 3-valved. Not succulent.

1. SESÙVIUM L. Sea Purslane

Calyx 5-parted, purplish inside, persistent, free. Petals none. Stamens 5–60, inserted on the calyx. Styles 3–5, separate. Pod 3–5-celled, many-seeded, circumscissile, the upper part falling off as a lid. — Usually prostrate maritime herbs, with succulent stems, opposite leaves, and axillary or terminal flowers. (An unexplained name.)

1. **S. marítimum** (Walt.) BSP. Annual, procumbent or sometimes erect; leaves oblong- to obovate-spatulate, obtuse; flowers sessile; stamens 5. (*S. pentandrum* Ell.) — Sea-coast, L. I. to Fla.

2. MOLLÙGO L. Indian Chickweed

Sepals 5, white inside. Stamens hypogynous, 5 and alternate with the sepals, or 3 and alternate with the 3 cells of the ovary. Stigmas 3. Capsule 3-celled, 3-valved, loculicidal, the partitions breaking away from the many-seeded axis. — Low homely annuals, much branched; the stipules obsolete. (An old Latin name for some soft plant.)

1. **M.** verticillàta L. (Carpet Weed.) Prostrate, forming mats; leaves spatulate, clustered in whorls at the joints, where the 1-flowered pedicels form a sort of sessile umbel; stamens usually 3. — Sandy river-banks, roadsides, and cultivated grounds. June–Sept. (Immigrant from farther south.)

CARYOPHYLLÀCEAE (Pink Family)

Herbs, with opposite entire leaves, symmetrical 4–5-merous flowers, with or without petals; the distinct stamens no more than twice the number of the sepals, either hypogynous or perigynous; styles 2–5 (or rarely united into one); seeds several or usually many, attached to the base or to the central column of the 1-celled (rarely 3–5-celled) pod, with a slender embryo coiled or curved around the outside of mealy albumen, in *Dianthus* nearly straight. — Bland herbs; the stems usually swollen at the joints; uppermost leaves rarely alternate. Leaves often united at the base. Calyx persistent. Styles stigmatic along the inside. Seeds amphitropous or campylotropous.

Tribe I. ALSÍNEAE. Sepals distinct or nearly so, imbricated in the bud. Petals when present without claws, mostly imbricated, and with the stamens inserted at the base of the sessile ovary, or into a little disk. Styles separate to the base. Stamens opposite the sepals, when not more in number. Low herbs.

* Stipules present; pod short.

1. **Spergularia.** Styles 3. Pod 3-valved. Leaves opposite.
2. **Spergula.** Styles 5. Valves of the pod opposite the sepals. **Leaves whorled.**

* * Stipules none.

+– Styles alternate with the sepals; stamens as many, or twice as many.

3. **Sagina.** Petals 4 or 5, entire, or none. Styles 4 or 5. Pod short, 4–5-valved.

+– +– Styles opposite the sepals, or, when fewer, opposite those which are exterior in the bud.

++ Pod short, splitting into as many valves as styles; valves often bifid or 2-parted.

4. **Arenaria.** Petals entire. Styles usually 3. Valves of the pod entire, bifid, or 2-parted.
5. **Stellaria.** Petals 2-cleft or none. Styles usually 3. Valves bifid or 2-parted.

++ ++ Pod cylindrical, dehiscent by twice as many equal teeth as styles.

6. **Cerastium.** Petals notched or 2-cleft. Styles 5 or 4. Seeds fixed edgewise.
7. **Holosteum.** Petals denticulate or notched. Styles usually 3. Seeds fixed by the face.

Tribe II. SILÈNEAE. Sepals united into a tube or cup. Petals (mostly convolute in the bud) and stamens (10) borne on the stipe or stalk of the ovary, the former with slender claws, to the base of which the corresponding filaments often adhere. Seeds numerous. Stipules none. Flowers often large and showy.

* Calyx naked; seeds globular or kidney-shaped; embryo curved or coiled.

8. **Agrostemma.** Calyx 5-toothed, 10-nerved. Styles 5, opposite the unappendaged petals.
9. **Lychnis.** Calyx 5-toothed, 10-nerved. Styles 5, alternate with the often appendaged petals.
10. **Silene.** Calyx 5-toothed, 10-nerved. Styles 3.
11. **Saponaria.** Calyx ovoid or sub-cylindrical, obscurely nerved, terete or 5-angled. Pod shortly 4-valved. Styles 2.
12. **Gypsophila.** Calyx top-shaped or campanulate. Pod deeply 4-valved. Styles 2.

* * Calyx with scaly bractlets or small leaves at the base; seeds flattened on the back, attached by the face; embryo nearly straight; styles 2.

13. **Tunica.** Calyx top-shaped or prismatic, with 5 strong nerves; flowers small.
14. **Dianthus.** Calyx cylindric or nearly so, with many fine nerves; flowers showy.

1. SPERGULÀRIA J. & C. Presl. Sand Spurrey

Sepals 5. Petals 5, entire. Stamens 2–10. Styles and valves of the many-seeded pod 3, very rarely 5, when the valves alternate with the sepals! Embryo not coiled into a complete ring. — Low herbs, ours annuals or biennials, mostly on or near the sea-coast, with filiform or linear opposite leaves, and smaller ones often clustered in the axils; stipules scaly-membranaceous; flowering all summer. (Name a derivative of *Spergula.*) Tissa & Buda Adans. Lepigonum Wahlb.

* *Not fleshy; stipules lanceolate, attenuate.*

1. **S. rùbra** (L.) J. & C. Presl. Nearly glabrous below the summit of the prostrate or ascending slender stems, peduncles, and sepals usually glandular-pubescent; leaves linear, flat, scarcely fleshy; stipules lanceolate, entire or cleft; pedicels longer than the bracts; *pods* and pink-red corolla small (3 mm. long), *about equaling the calyx; seeds rough with projecting points, semi-obovate or gibbous-wedge-shaped, wingless.* — Dry sandy soil, e. Que. to Va. and O., chiefly near the coast, but rarely maritime. (Eu.)

* * *Distinctly fleshy, annual; root fibrous; stipules ovate or deltoid, acuminate.*

2. **S. marina** (L.) Griseb. Much branched, procumbent or suberect, pale green, mostly glandular-pubescent; *sepals* nearly or quite *as long as the ovoid acutish pod;* seeds pale brown, very minute. (*S. salina* J. & C. Presl; *Buda marina* Man. ed. 6; *Tissa marina* Britton.) — Brackish sands, etc., N. B. to Fla.; also on the Pacific Slope and in saline regions of the interior. (Eurasia.)

3. **S. canadènsis** (Pers.) Don. Diffusely branched, greener, smoother and somewhat more slender than the preceding species; *sepals* rounded at the apex,

about half as long as the very blunt pod; seeds dark brown, relatively large. (*Buda borealis* Wats.; *Tissa canadensis* Britton; *S. borealis* Robinson.) — Coast of Lab. to R. I. (*J. F. Collins*).

* * * *Fleshy biennial with a thick root.*

4. **S. mèdia** (L.) C. Presl. Stout root perpendicular; stems spreading; flowers large; pods at length 7 mm. long, exceeding the calyx; seeds mostly winged. — Near Salina, N. Y. (*Fry*); also Cal. (Eu.)

2. SPÉRGULA L. Spurrey

Stamens 5 or 10. Styles 5. The 5 valves of the pod opposite the sepals. Embryo spirally annular. Leaves in whorls. Otherwise as *Spergularia*. (Name from *spargere*, to scatter, from the seeds.)

1. **S. arvénsis** L. (Corn S.) Annual, *bright green*, scarcely or not at all viscid; leaves numerous, in whorls, thread-shaped (2–5 cm. long); stipules minute; petals white; *seeds roughened with minute whitish papillae.* — Grain fields, etc., common. (Nat. from Eu.)

2. **S. satìva** Boenn. Similar but *dull green* and distinctly viscid; flowers ill-scented; *seeds* margined, obscurely dotted, *not papillate.* — Sparingly adventive in fields, Ct. (*Graves*) and Vt. (*Jones*) to Ont. (*Fletcher*).

3. SAGÌNA L. Pearlwort

Sepals 4 or 5. Petals 4 or 5, undivided, or often none. Stamens as many as the sepals, rarely twice as many. Styles as many as the sepals and alternate with them. Pod many-seeded, 4–5-valved to the base; valves opposite the sepals. — Little matted herbs, with thread-like or awl-shaped leaves, no stipules, and small flowers terminating the stems or branches; in summer. (Name from *sagina*, fattening; previously applied to the Spurrey.)

Upper leaves not proliferous; petals not longer than the sepals.
- Seeds at maturity orange-brown, dotted with resinous atoms . . . . 1. *S. decumbens.*
- Seeds at maturity dark or grayish brown, smoothish or roughened but without atoms . . . . . 2. *S. procumbens.*

Upper leaves with fascicles of reduced leaves in their axils; petals decidedly longer than the sepals . . . . . 3. *S. nodosa.*

1. **S. decúmbens** (Ell.) T. & G. Annual, ascending; the peduncles and calyx with the margins of the upper leaves *at first glandular-pubescent;* leaves short, often bristle-tipped; sepals and valves 5 or rarely 4; pod oblong-ovoid, nearly twice longer than the calyx. (*S. apetala* Am. auth., not Ard.) — Mass. to Ill., Mo., and southw. Var. Smíthii (Gray) Wats., a slender form, *apetalous*, at least in the later flowers. — In waste ground near Philadelphia, and in sandy fields at Somers Point, N. J. (*C. E. Smith*).

2. **S. procúmbens** L. Annual or perennial, *depressed or spreading* on the ground, glabrous; leaves linear-thread-shaped; *apex of the peduncle often hooked* soon after flowering; *petals shorter than the* broadly ovate obtuse *sepals*, sometimes none. — Springy places and damp rocks, chiefly near the coast, Nfd. to Pa. and Del.; also Ont. and Mich. (Eu.)

3. **S. nodòsa** (L.) Fenzl. Tufted perennial, erect, glabrous; *upper leaves very short, proliferous in their axils;* petals 5, white, conspicuous. — Rocky shores, etc., Cutler, Me. (*Kennedy*), Isle Royale, L. Superior, and northw. (Eu.) Var. glandulòsa (Bess.) Asch. Peduncles, etc., more or less glandular-puberulent. — Cape Ann, Mass., to Me. (Eu.)

4. ARENÀRIA L. Sandwort

Sepals 5. Petals 5, entire, sometimes barely notched, rarely wanting. Stamens 10. Styles 3, rarely more or fewer, opposite as many sepals. Pod short, splitting into as many or twice as many valves as there are styles, few-many.

seeded. — Low usually tufted herbs, with sessile exstipulate leaves and small white flowers. (Name from *arena*, sand, in which many of the species grow.) — The following sections are by many botanists taken for genera.

§ 1. MOEHRÍNGIA (L.) Fries. *Ovary at first 3-celled; seeds few, smooth, with a thickish appendage at the hilum; perennials with broadish leaves.*

1. **A. lateriflòra** L. Sparingly branched, minutely pubescent; *leaves oval or oblong, obtuse* (1–2 cm. long); peduncles 2(rarely 3–4)-flowered, soon becoming lateral; sepals oblong, obtuse. (*Moehringia* Fenzl.) — Gravelly shores, thickets, etc., Nfd. to Pa., Mo., and northw. May, June. (Eu.)

2. **A. macrophýlla** Hook. Similar; *leaves lance-oblong, acute;* sepals lanceolate, acuminate. (*Moehringia* Torr.) — N. Guilford and Durham, Ct. (*G. H. Bartlett, Harger*), Vt., Lab., L. Superior, and northwestw.

§ 2. AMMODÈNIA (Patrin) B. & H. *Styles, cells of the ovary and valves of the fleshy pod 3, rarely 4 or 5; seeds few, smooth, short-beaked at the naked hilum; disk under the ovary more prominent than usual, glandular, 10-lobed; flowers almost sessile in the axils, sometimes dioecious or polygamous; perennial.*

3. **A. peploìdes** L. Stems (simple or forking from long rootstocks) and ovate partly clasping leaves (1.5–2 cm. long) very fleshy. (*Ammodenia* Rupr.) — Sea-shore, N. J. to Me. and northw. June. (Eu.)

§ 3. ARENÀRIA proper. *Pod splitting wholly or part way down into 3 or at length 6 valves; seeds many, naked at the hilum.*

4. **A.** SERPYLLIFÒLIA L. (THYME-LEAVED S.) Roughish-pubescent or puberulent, 5–15 cm. high; *leaves ovate*, small, acute; cymes leafy; sepals lanceolate, pointed, 3–5-nerved, about equaling the petals; *capsule flask-shaped, of firm texture.* — Sandy or rocky soil, chiefly about towns. June–Aug. (Nat. from Eu.)

5. **A.** LEPTÓCLADOS Guss. Similar to the preceding; *leaves lanceolate;* cymes nearly naked; *capsule subcylindric, papery.* (*A. serpyllifolia*, var. *tenuior* Koch.) — Locally, Me. to Mich. (*Farwell*), and westw. (Adv. from Eu.)

§ 4. ALSÌNE (Gaertn.) B. & H. *Pod splitting to the base into 3 entire valves; seeds many, usually rough, naked at the hilum; flowers terminal or cymose; leaves linear or subulate.*

Sepals lanceolate, acuminate.
  Lateral nerves of the leaves none or much smaller than the midnerve.
    Petals retuse . . . . . 6. *A. patula.*
    Petals entire.
      Capsule longer and petals shorter than the sepals . . . . 7. *A. litorea.*
      Capsule shorter and petals much longer than the sepals . . . 8. *A. stricta.*
  Leaves with 3 nearly equal nerves . . . . . 9. *A. verna*, v. *propinqua.*
Sepals obtuse or obtusish, inconspicuously veined, not nerved.
  Leaves rigid, pungent; petals entire . . . . . 10. *A. caroliniana.*
  Leaves soft, herbaceous; petals usually retuse . . . . . 11. *A. groenlandica.*

6. **A. pátula** Michx. *Diffusely branched from a slender root;* stems 5–30 cm. long; branches of the cyme divergent; peduncles long; sepals 3–5-nerved. — Ky. to n. Ill., Minn., and southw. to Tex. and Fla.

7. **A. litòrea** Fernald. *Perennial, densely tufted;* stems several to many, 6–14 cm. high, leafy chiefly toward the base; *leaves firm*, subulate, commonly proliferous in the axils; sepals 3-nerved; *capsule 5 mm. long, well exserted* at maturity. — Gravelly beaches and calcareous bluffs, e. Que.; and north shore of L. Superior (*Loring, G. S. Miller*).

8. **A. stricta** Michx. Erect or diffusely spreading from a small root, smooth; *leaves slender, between awl-shaped and bristle-form, with many others clustered in the axils; cyme diffuse*, naked, many-flowered; *sepals 3-ribbed*, ovate. (*A. Michauxii* Hook. f.) — Rocks and dry wooded banks, Mt. Washington, N. H (*Manning*); Vt. to S. C., Minn., westw. and southwestw. July.

Var texàna Robinson. More rigid; leaves shorter (6–10 mm. long), chiefly near the base; *cymes rather dense;* sepals attenuate, rigid. (*A. texana* Britton.) — Rocky hills, s Mo. to Kan. and Tex.

9. **A. vérna** L., var. **propínqua** (Richards.) Fernald. Dwarf, tufted or loosely matted, 2–12 cm. high, glandular-puberulent; *leaves* awl-shaped, *somewhat triquetrous;* stems chiefly 2–5-flowered; *sepals rather abruptly acuminate*, commonly longer than the oblong or spatulate often inconspicuous petals. (*A. propinqua* Richards.; *A. verna*, var. *hirta* auth., in part.) — Limestone or serpentine rocks and barrens, Lab., e. Que., Smuggler's Notch, Vt. (*Pringle, Eggleston*), northw. and westw.

10. **A. caroliniàna** Walt. (Pine-barren S.) Densely tufted from a deep perpendicular root; *leaves closely imbricated*, but spreading, *awl-shaped, pungent, short, channeled;* branches naked and minutely glandular above, several-flowered; *sepals obtuse*, ovate, shorter than the pod. (*A. squarrosa* Michx.) — In pure sand, s. New York, N. J., and southw. along the coast. May–July.

11. **A. groenlándica** (Retz.) Spreng. (Mountain S.) Densely tufted from slender roots; stems filiform (5–20 cm. high), erect; *leaves linear, obtuse, flaccid;* petals obovate, commonly retuse, about twice as long as the *oblong nerveless sepals.* — Greenl., Lab., mts. of N. E., N. Y., and higher Alleghenies to N. C.; also coast of N. S. and Me.; Middletown, Ct., etc. June–Sept. — An apetalous form occurs.

5. STELLÀRIA L. Chickweed. Starwort

Sepals 4–5. Petals (white) 4–5, deeply 2-cleft, sometimes none. Stamens 8, 10, or fewer. Styles 3, rarely 4 or 5, opposite as many sepals. Pod ovoid, 1-celled, opening by twice as many valves as there are styles, several-many-seeded. Seeds naked. — Flowers solitary or cymose, terminal or appearing lateral by the prolongation of the stem from the upper axils. (Name from *stella*, a star, in allusion to the star-shaped flowers.) Alsine L. in part, not Wahlenb.

Stems and flower-stalks glabrous.
- Petals distinctly shorter than the sepals or none.
  - Leaves lanceolate.
    - Flowers axillary or in leafy-bracted cymes . . . . . 1. *S. borealis.*
    - Flowers chiefly in short lateral scaly-bracted cymes . . . . . 2. *S. uliginosa.*
  - Leaves spatulate . . . . . 8. *S. fontinalis.*
- Petals equaling or exceeding the sepals.
  - Flowers axillary, solitary, or in leafy-bracted cymes.
    - Leaves lanceolate.
      - Leaves of soft texture, flat or nearly so.
        - Mature sepals 3–4 mm. long, two thirds as long as the pod . . 4. *S. crassifolia.*
        - Mature sepals less than 3 mm. long, half the length of the pod . 1. *S. borealis.*
      - Leaves of firm texture, carinate . . . . . 7. *S. longipes.*
    - Leaves elliptic-ovate . . . . . 5. *S. humifusa.*
  - Flowers cymose; bracts small, scale-like.
    - Petals 8–12 mm. long; leaves linear, glaucous . . . . . 6. *S. glauca.*
    - Petals 3–6 mm. long.
      - Lower pedicels erect, elongated; fruit blackish . . . . . 7. *S. longipes.*
      - Lower pedicels deflexed, arcuate; fruit pale.
        - Leaves linear or nearly so; inflorescence lateral . . . . 8. *S. longifolia.*
        - Leaves lanceolate; inflorescence terminal . . . . . 9. *S. graminea.*

Stems and flower-stalks pubescent.
- Leaves narrowly lanceolate.
  - Flower 1 cm. in diameter; fruit blackish, on erect pedicels . . . 7. *S. longipes.*
  - Flower 2 cm. in diameter; fruit straw-colored, on nodding pedicels . . 10. *S. Holostea.*
- Leaves elliptical, chiefly sessile . . . . . 11. *S. pubera.*
- Leaves ovate, the lower on petioles of nearly their own length.
  - Styles 3–4; pods narrowly ovoid, subcylindric . . . . . 12. *S. media.*
  - Styles 5; pods broadly ovoid . . . . . 13. *S. aquatica.*

1. **S. boreàlis** Bigel. Stems flaccid, many times forked, at length resolved into a leafy cyme; *leaves* bright green, *rather broadly lanceolate; petals* 2–5, *minute, or none;* sepals acute; styles usually 4; seeds smoothish. (*Alsine* Britton.) — Shaded or wet places, Nfd. and Lab. to Alaska, s. to N. J., Pa., Mich., Minn., Col., and Cal. (Eu.)

2. **S. uliginòsa** Murr. Stems weak, decumbent or diffuse, at length prolonged, leaving the *naked and usually sessile cymes lateral; leaves lanceolate* or

lance-oblong; seeds roughened. (*Alsine* Britton.) — Swamps and rills, Md. to P. E. I. and Nfd.; also Mich., infrequent. (Eu.)

3. **S. fontinàlis** (Short & Peter) Robinson. *Stems flaccid*, regularly *dichotomous*, bearing *flowers in the forks; leaves linear-spatulate*, obtusish; *petals none*. (*Sagina* Short & Peter; *Alsine* Britton.) — Moist cliffs, etc., Ky. and Tenn.

4. **S. crassifòlia** Ehrh. Stems diffuse or erect, flaccid; *leaves rather fleshy, oblong-lanceolate*, acutish; *petals longer than the sepals;* seeds rugose-roughened. (*Alsine* Britton.) — Springy places, Lab. and Gulf of St. Lawrence to Ill., and northwestw. (Eu.)

5. **S. humifùsa** Rottb. Spreading or creeping; stems and branches (5 cm. high) 1–3-flowered; *leaves* fleshy, *ovate or elliptical* (4–6 mm. long); *petals a little longer than the sepals;* seeds smooth. (*Alsine* Britton.) — Salty or brackish marshes, Little Cranberry I., Me. (*Redfield*) to Lab., Greenl.; and Hudson B.; rarely on inland shores, Upper St. John R., Me. (*Goodale*); also on the Pacific coast. June–Aug. (Eu.)

6. **S.** GLAÚCA With. Tall (3–5 dm. high) and very slender, *pale green;* flowers large, on *long pedicels* (often 6 cm. in length); sepals lance-linear, acute, considerably exceeded by the petals; leaves (2–4 cm. long) narrow, not at all ciliolate at the base. — Grassy places along the railway, near St. Anne de Beaupré, Que. (*Churchill, Murdoch*). (Nat. from Eu.)

7. **S. lóngipes** Goldie. Erect or decumbent, 3 dm. high, essentially glabrous; leaves linear-lanceolate, gradually attenuate from near the base, shining or glaucescent, spreading, 2–4.5 cm. long; inflorescence terminal, dichotomous; pedicels 2–3.5 cm. long; *pod narrowly ovoid, exserted, shining, nearly black.* (*Alsine* Coville.) — Woods, etc., near L. Ontario; and in varying forms from the Sask. far northw. and westw.

Var. **laèta** (Richards.) Wats. *Usually very glaucous*, 1–2 dm. high; leaves shorter and relatively broader, erect and somewhat rigid, 1–2 cm. long; inflorescence often reduced to 1 or 2 flowers. — The commoner form northeastw.; on sandy or gravelly beaches about the Gulf of St. Lawrence, Hudson B., northw. and westw. June.

8. **S. longifòlia** Muhl. Stem erect, weak, often with rough angles (2–5 dm. high); *leaves linear*, acutish at both ends, spreading; *cymes scaly-bracted, at length lateral, peduncled*, many-flowered; the slender pedicels spreading or deflexed; fruit pale straw-colored; seeds smooth. (*Alsine* Britton.) — Grassy places, Nfd. to Md., and westw. June, July. (Eu.)

9. **S.** GRAMÍNEA L. Stems weak, ascending or reclining, 3–5 dm. high, rhombic in section; *leaves narrowly lanceolate, broadest a little above the ciliolate base; inflorescence pedunculate, terminal*, diffuse, many-flowered; seeds strongly but minutely roughened. (*Alsine* Britton.) — Grassy places, frequent. (Introd. from Eu.) Var. LATIFÒLIA Peterm. is a form with somewhat broader *ovate- or oblong-lanceolate leaves*, the lowest subpetiolate. — In similar situations.

10. **S.** HOLÓSTEA L. Rather tall; *leaves long* (3–8 cm.), sessile, *conspicuously attenuate*, ciliolate on the margin and midnerve beneath; *petals large*, obovate, usually cleft only a fourth to half their length. (*Alsine* Britton.) — Often cultivated, and tending to become established. (Adv. from Eu.)

11. **S. pùbera** Michx. (GREAT C.) *Root perennial; leaves elliptic-oblong*, ciliolate, 1.5–5 cm. long, sessile or the lowest somewhat petiolate; petals longer than the calyx; stamens 10. (*Alsine* Britton.) — Shaded rocks, N. J. and Pa. to Ind. and southw. May. — The petals are cleft sometimes half their length, sometimes nearly to the base. Late shoots produce much larger leaves and often reduced flowers.

12. **S.** MÈDIA (L.) Cyrill. (COMMON C.) *Annual or nearly so; stem hairy in lines; leaves ovate* to ovate-oblong, the lower on hairy petioles; petals shorter than the calyx, 2-parted; stamens 3–7; seeds scarcely roughened. (*Alsine* L.) — A common weed. (Nat. from Eu.) Var. PRÓCERA Klett & Richter (*S. neglecta* Weihe) with 10 stamens and more or less crested seeds, has been reported by *Holm* from Washington, D. C.; Sable I., N. S.; Man.; and B. C. (Adv. from Eu.)

13. **S.** AQUÁTICA (L.) Scop. *Perennial*, glandular-pubescent; *leaves large, ovate*, acute, cordate, the lower petiolate; petals much exceeding the glandular-pubescent sepals. (*Alsine* Britton.) — Occasional on waste land, in parks, etc., in the Eastern States, w. Que. and Ont. (Adv. from Eu.)

6. CERÁSTIUM L. MOUSE-EAR CHICKWEED

Sepals 5, rarely 4. Petals as many, 2-lobed or -cleft, rarely entire, often wanting in some of the flowers. Stamens 10 or fewer. Styles mostly 5, rarely 4 or 3, opposite the sepals. Pod 1-celled, usually elongated, often curved, membranaceous, opening at the summit by twice as many teeth as there were styles, many-seeded. Seeds rough. (Name from κέρας, *a horn*, alluding to the shape of the pod.)

Perennial.
- Petals much longer than the sepals . . . . . 1. *C. arvense.*
- Petals equaling or shorter than the sepals or wanting . . . . . 2. *C. vulgatum.*

Annual.
- Pedicels 4–10 mm. long.
  - Sepals lanceolate, attenuate.
    - Bracts not scarious-margined; petals (if present) ciliolate at base . 3. *C. viscosum.*
    - Bracts scarious-margined; petals (if present) naked . . . . 4. *C. semidecandrum.*
  - Sepals oblong, merely acutish; petals (if present) naked . . . 5. *C. brachypodum.*
- Pedicels, at least the lower ones, 1.5–5 cm. long . . . . . 6. *C. nutans.*

1. **C. arvénse** L. (FIELD M.) Stems ascending or erect, tufted, downy or nearly smooth, slender (1–2 dm. high), naked and few-several-flowered at the summit; leaves linear or narrowly lanceolate; *petals obcordate, more than twice the length of the calyx; pods* (about 1 cm. long) *one third to two thirds longer than the calyx.* — Dry or rocky places, Lab. to Alaska, s. to Del., Pa., Ind., Mich., Minn., etc., and along the mts. to Ga. May–July. (Eu.)

Var. **oblongifólium** (Torr.) Hollick & Britton. Usually taller, pubescent; leaves narrowly to broadly oblong or oblong-lanceolate; *pod about twice as long as the calyx.* (*C. oblongifolium* Torr.) — Rocky places, chiefly serpentine, N. Y. to Minn., Col., and southw. Var. VILLÒSUM Hollick & Britton Similar, but *densely villous-pubescent*, and the leaves lanceolate to ovate-lanceolate. (Var. *velutinum* Britton.) — Serpentine barrens, etc., e. Pa.; also reported at Hamilton, Ont. (*Dickson* according to J. M. Macoun).

2. **C.** VULGÀTUM L. (COMMON M.) Stems clammy-hairy, spreading (1.5–4 dm. long); leaves chiefly oblong (varying to spatulate and ovate-lanceolate); *upper bracts nearly herbaceous;* flowers at first clustered; sepals 4–6 mm. long, obtusish; *pedicels longer*, the fruiting ones much *longer than the calyx.* (*C. viscosum* of the Linnean herbarium; *C. triviale* Link.) — Fields, dooryards, etc.; common. May–July. (Nat. from Eu.)

3. **C.** VISCÒSUM L. Hairy and rather clammy, nearly erect (1–2 dm. high); leaves ovate to obovate or oblong-spatulate; bracts herbaceous; *flowers small, at first in close clusters; pedicels* even in fruit *not longer than the very acute sepals;* petals shorter than the calyx. (*C. vulgatum* of the Linnean herbarium; *C. glomeratum* Thuill.) — Grassy places, chiefly in the middle Atlantic, Gulf, and Pacific States. (Nat. from Eu.)

4. **C.** SEMIDECÁNDRUM L. Similar to the preceding but smaller; *bracts conspicuously scarious-margined;* pedicels in fruit slightly exceeding the sepals. — Dry soil, locally established, Nantucket (*Churchill*) and Ct. (*Graves*) to Va. (Adv. from Eu.)

5. **C. brachýpodum** (Engelm.) Robinson. Pale green, viscid-pubescent; leaves oblong; flowers in a dense or sometimes open dichotomous cyme; *pedicels* about *equaling the capsules; these* usually 2–3 *times as long as the sepals.* (*C. nutans*, var. Engelm.) — Near St. Louis, Mo. (*Engelmann*) to La., westw. and northwestw.

6. **C.** nùtans Raf. Stems erect, slender, grooved, diffusely branched (1.5–5 dm. high); cyme loose, many-flowered; leaves oblong-lanceolate, acute, the lowest spatulate; *peduncles elongated*, more or less hooked; petals (sometimes

reduced or wanting) a little longer than the calyx; *pods* nodding on the stalks, curved upward, nearly or quite *thrice the length of the calyx.* (*C. longe pedunculatum* Muhl., as *nomen subnudum.*)—Moist rich soil, "N. S."; and Vt. to Athabasca, southw. and westw. May–July.

7. HOLÓSTEUM [Dill.] L. Jagged Chickweed

Sepals 5. Petals 5, usually jagged or denticulate at the point. Stamens 3–5, rarely 10. Styles mostly 3. Pod ovoid, 1-celled, many-seeded, opening at the top by 6 teeth. Seeds rough, flattened on the back, attached by the inner face. —Annuals or biennials, with several (white) flowers in an umbel borne on a long terminal peduncle. (Name from ὁλόστεον, a word used by Dioscorides for some unknown plant.)

1. H. umbellàtum L. Leaves oblong; peduncle and upper part of the stem glandular-pubescent; pedicels reflexed after flowering. —Roadsides, fields, etc., N. J. and Pa. to Ga. Apr., May. (Nat. from Eu.)

8. AGROSTÉMMA L. Corn Cockle

Calyx ovoid, with 10 strong ribs; the elongated teeth (in ours 2–3 cm. long) exceeding the 5 large unappendaged petals. Stamens 10. Capsule 1-celled Leaves linear.—Tall silky annual or biennial. (Name from ἀγρός, *field*, and στέμμα, *crown.*)

1. A. Githàgo L. Flowers 2.5–4 cm. in diameter; petals purplish-red, paler toward the claw and spotted with black. (*Lychnis* Scop.)—Grainfields, and less frequently by roadsides. (Introd. from Eu.)—Seeds poisonous.

9. LÝCHNIS [Tourn.] L. Campion

Styles 5, rarely 4, and pod opening by as many or twice as many teeth; otherwise nearly as in *Silene.* (Ancient Greek name for a scarlet or flame-colored species, from λύχνος, *a light* or *lamp.*)

* *Calyx-teeth twisted; petals large; plant white-woolly.*

1. L. coronària (L.) Desr. (Mullein Pink.) Stem 4–9 dm. high; leaves oval or oblong; petals crimson.—Showy plant, often cultivated and now locally established, Me. to N. Y. and Mich. (Introd. from Eu.)

** *Calyx-teeth not twisted; petals showy, much exserted; plant green.*

+ *Flowers perfect.*

2. L. Flos-cùculi L. (Ragged Robin.) Perennial, erect, slightly downy below, viscid above; leaves narrowly lanceolate; *flowers in loose panicles;* calyx short, glabrous; *petals* red, 4-*lobed*, lobes linear.—Moist or marshy places, and in waste land, N. B. to N. J. and Pa.—Often cultivated. (Introd. from Eu.)

3. L. chalcedónica L. (Scarlet Lychnis.) Stout erect perennial with ovate leaves and *hemispherical clusters* of scarlet flowers; *petals bifid.*—Cultivated, and locally escaped in the Northern States. (Introd. from Japan.)

+ + *Flowers dioecious or polygamous.*

4. L. dioíca L. (Red C.) Leaves ovate to lance-oblong; flowers red to rarely white, inodorous, diurnal; *calyx-teeth triangular-lanceolate, acute;* capsule globose with a wide mouth at dehiscence. (*L. diurna* Sibth.)—Waste grounds and roadsides, common, especially eastw. (Adv. from Eurasia.)

5. L. álba Mill. (White C.) Similiar in foliage; flowers white or pink, fragrant, opening in the evening; *calyx-teeth* longer, *attenuate;* capsule ovoid conical, narrow-mouthed at dehiscence. (*L. vespertina* Sibth.)—Same situations, but less common. (Adv. from Old World.)—Resembles *Silene noctiflora* but has 5 styles.

** * * Calyx-teeth not twisted; petals small, included or scarcely exserted.*

6. **L. Drummóndii** (Hook.) Wats. Cinereous-puberulent; stems erect, almost naked above; leaves narrow; pedicels often long, erect; calyx ovoid-cylindric. — Dry plains, Neb. (*Webber*) to e. Minn. (*Shetdon*), Man. and westw.

10. SILÈNE L. Catchfly. Campion

Calyx 5-toothed, 10–many-nerved, naked at the base. Stamens 10. Styles 3, rarely 4. Pod 1-celled, sometimes 3-celled at least at the base, opening by 3 or 6 teeth at the apex. — Flowers solitary or in cymes. Petals mostly crowned with a scale at the base of the blade. (Name from σίαλον, *saliva*, from the viscid exudation on the stems and calyx of many species. The English name *Catchfly* alludes to the same peculiarity.)

** Calyx many-ribbed; annual.*

1. **S. cónica** L. Puberulent to tomentulose; stems usually several (1.5–5 dm. high), leafy; leaves linear-lanceolate, acute; calyx ovoid, strongly ribbed, 1.5 cm. long, the teeth attenuate; petals small, purple or pink. — Waste places, casual, Dartmouth, Mass. (*Hervey*); "Clyde, O." (Adv. from Eu.)

** * Calyx 5–10-nerved, not inflated except by the enlarging pod; annuals.*

← Glabrous, a portion of each joint of the stem glutinous; flowers not racemose.

2. **S. antirrhìna** L. (Sleepy Catchfly.) Stem slender (2–9 dm. high); *leaves lanceolate or linear;* flowers small, paniculate; *calyx ovoid;* petals obcordate, crowned, opening transiently in sunshine. — Dry soil; common in waste places and open woods, centr. Me., westw. and southw. June–Sept.

Var. **divaricàta** Robinson. Still more slender, the filiform branches and peduncles usually spreading; petals none. — Dry woods, Mass. to Ill., Mo., and Kan.

3. **S. Armèria** L. (Sweet William Catchfly.) Glaucous; *leaves ovate-lanceolate;* flowers in flat cymes, open in sunshine; *calyx club-shaped;* petals rose-colored or white, notched, crowned with awl-shaped scales. — Escaped from gardens. (Adv. from Eu.)

← ← Pubescent and more or less viscid; flowers racemose; pedicels short.

4. **S. gállica** L. *Leaves spatulate, obtuse,* mucronate (1.5–3.5 cm. long); *racemes simple,* terminal, one-sided; calyx ovoid, villous-hirsute; petals small. (*S. anglica* L.) — Fields and waste places, local. (Adv. from Old World.)

5. **S. dichótoma** Ehrh. Tall, more or less hirsute; *leaves lanceolate or oblanceolate; racemes branched;* flowers short-pediceled, one in each fork, the others solitary at the nodes of the spreading rhachises; calyx-ribs 5, hirsute, simple; petals much exserted, white or pink. — Clover fields, etc., N. E. to Tex., and on the Pacific Slope. (Introd. from Eu.)

← ← ← Pubescent and viscid; flowers cymose.

6. **S. noctiflòra** L. (Night-flowering Catchfly.) Tall (3–9 dm. high); lower leaves large and spatulate, the upper lanceolate; flowers few, large, peduncled, white or nearly so, fragrant, opening at night; calyx-tube 2.5 cm. long, with awl-shaped teeth. — Cultivated grounds.

** * * Calyx 5–10-nerved, elongated or club-shaped, not inflated except by the enlarging pod; flowers cymose or clustered; perennial, pubescent with viscid hairs, especially the calyx.*

← Petals white or rose-color.

7. **S. Menzièsii** Hook. Weak, low, dichotomously branched; *flowers small, white,* in leafy cymes; calyx obconical; *petals* 2-cleft, usually *crownless.* — S. Mo. (*Blankinship*) to Neb., Assina., and westw.

8. **S. nùtans** L. Leafy chiefly near the base; stems 3–6 dm. high, slender, bearing a narrow *panicle of* nodding *pink flowers; petals* rather deeply bifid

crowned. — Mt. Desert I., Me. (*Miss Minot*) and Staten I., N. Y. (*Kerr*); doubtfully established. (Adv. from Eu.)

9. S. pennsylvánica Michx. (Wild Pink.) Stems low (1–2 dm. high); root-leaves narrowly spatulate, nearly glabrous, tapering into hairy petioles; *stem-leaves* (2 or 3 pairs) *lanceolate; flowers cymosely clustered*, short-stalked; calyx club-shaped; *petals wedge-form, slightly notched and eroded, pink.* (*S. caroliniana* Walt. ?) — Gravelly and rocky places, e. Mass. to N. Y., Ky., and southw. Apr.–June.

← ← *Petals long, deep crimson or scarlet, crowned.*

10. S. virgínica L. (Fire Pink, Catchfly.) Stems slender (3–6 dm. high); *leaves thin, spatulate, or the upper oblong-lanceolate; flowers few and loosely cymose*, peduncled; calyx subcylindrical, soon obconical; *petals oblong, 2-cleft, deep crimson*, the limb 2.5 cm. long. — Open woods, s. N. J. to w. N. Y., s. w. Ont., Minn., and southw. June–Aug.

11. S. règia Sims. (Royal Catchfly.) Stem roughish, erect (1 m. high); *leaves thickish, ovate-lanceolate*, acute; *flowers numerous, short-stalked*, in clusters, forming a strict panicle; calyx ovoid-club-shaped in fruit; *petals spatulate-lanceolate, mostly undivided, deep scarlet.* — Prairies, O. to Mo., and southw. July.

12. S. rotundifòlia Nutt. (Round-leaved Catchfly.) Viscid-hairy; stems weak, branched, decumbent (6 dm. long); *leaves thin, round, abruptly pointed*, the lower obovate; flowers few, loosely cymose, stalked; calyx elongated; *petals 2-cleft and cut-toothed, deep scarlet.* — Shaded banks, s. O., Ky., and southw. June–Aug. — Leaves and flowers large.

* * * * *Calyx bladdery-inflated; perennial; flowers panicled, white, in summer.*

13. S. stellàta (L.) Ait. f. (Starry Campion.) Stem 7–10 dm. high, with a large and open pyramidal panicle; *leaves in whorls of 4, ovate-lanceolate*, taper-pointed; calyx bell-shaped; corolla 2 cm. broad; *petals cut into a fringe, crownless.* — Wooded banks, Mass. to Minn., Neb., and southw.

14. S. nívea (Nutt.) Otth. *Leaves opposite, lanceolate or oblong*, taper-pointed; calyx subcylindric; *petals wedge-form, 2-cleft, minutely crowned.* (*S. alba* Muhl., as *nomen subnudum.*) — Pa. to D. C., w. to Minn. and Neb., rare; also cultivated, and occasionally escaped elsewhere.

15. S. latifòlia (Mill.) Britten & Rendle. (Bladder Campion.) *Glaucous; leaves opposite, ovate-lanceolate; calyx globular, much inflated*, elegantly veined; petals 2-cleft, nearly crownless. (*S. inflata* Sm.; *S. Cucubalus* Wibel; *S. vulgaris* Garcke.) — Fields, roadsides, and alluvial banks, e. Que. to Ont., s. to N. J., Ill., and Ia. — Flowers loosely cymose. (Nat. from Eu.)

* * * * * *Dwarf, alpine, tufted, smooth, perennial; flowering shoots 1-flowered.*

16. S. acaúlis L. (Moss Campion.) Tufted like a moss; leaves linear, crowded; flowers almost sessile, or rarely on a naked peduncle; petals purple or rarely white, notched or entire, crowned. — Alpine summits of the White Mountains, N. H., and northw.; also western mountains. July. (Eu.)

11. SAPONÀRIA L.

Calyx narrowly ovoid or subcylindric, 5-toothed, obscurely nerved, naked. Stamens 10. Styles 2. Pod 1-celled, or incompletely 2–4-celled at base, 4-toothed at the apex. — Coarse annuals or perennials, with large flowers. (Name from *sapo*, soap, the mucilaginous juice forming a lather with water.)

1. S. officinàlis L. (Soapwort, Bouncing Bet.) Flowers in corymbed clusters; *calyx terete;* petals crowned with an appendage at the top of the claw; leaves oval-lanceolate. — Roadsides, etc. July–Sept. — A stout perennial, with large rose-colored flowers, commonly double. (Adv. from Eu.)

2. S. Vaccària L. (Cow-herb.) Annual, glabrous; flowers in corymbed cymes; *calyx 5-angled*, enlarged and wing-angled in fruit; petals pale red, not crowned; leaves ovate-lanceolate. (*Vaccaria vulgaris* Host; *V. Vaccaria* Britton.) — Occasionally spontaneous, or a weed in grainfields. (Adv. from Eu.)

12. GYPSÓPHILA L.

Calyx narrowly top-shaped or campanulate, 5-nerved, 5-toothed, naked at base. Petals not crowned. Stamens 10. Styles 2. Pod 1-celled, 4-valved at the apex, sessile. — Slender glaucous annuals or perennials, with numerous small flowers. (Name from γύψος, *gypsum*, and φιλεῖν, *to love.*)

1. G. MURÀLIS L. Annual, much branched; leaves very narrowly linear; flowers on slender pedicels, solitary in the forks; calyx turbinate, the teeth short, obtuse; petals purplish, crenate or emarginate. — Fields, roadsides, etc., Me. to N. J., Ont., and Minn. (Nat. from Eu.)

13. TÙNICA [Rupp.] Scop.

Calyx 5-ribbed, bluntly toothed. Petals 5. Styles 2. — Slender wiry-stemmed herbs with small terminal flowers and linear leaves. (Name from *tunica*, a tunic, referring probably to the close-fitting calyx.)

1. T. SAXÍFRAGA (L.) Scop. Low, many-stemmed; leaves less than 1 mm. broad; bractlets 2 pairs, scarious except in the middle; small petals purplish, notched. — Roadsides, etc., Flushing, L. I. (*J. Schrenk*); London, Ont. (*Burgess*). (Adv. from Eu.)

14. DIÁNTHUS L. Pink. Carnation

Calyx cylindrical, nerved or striate, 5-toothed, subtended by 2 or more imbricated bractlets. Stamens 10. Styles 2. Pod 1-celled, 4-valved at the apex. Seeds flattish on the back; embryo scarcely curved. — Ornamental plants, of well-known aspect and value in cultivation. (Name from Διός, *of Jupiter*, and ἄνθος, *flower, i.e.* Jove's own flower.)

1. D. PRÓLIFER L. *Annual, smooth*, slender; flowers clustered; *bractlets ovate, dry*, concealing the calyx; leaves few, narrow, linear, erect; petals small, pink. — Roadsides and fields, s. e. N. Y. to Del.; also Cleveland, O. (*Beardslee*). (Nat. from Eu.)

2. D. DELTOÌDES L. (MAIDEN P.) *Perennial;* leaves short, narrowly lanceolate, glabrous or roughish; *flowers solitary;* bracts ovate, half as long as the tube; petals rose-color or white, toothed. — Dry open places, e. N. E. to Mich., becoming more frequent. (Nat. from Eu.)

3. D. BARBÀTUS L. (SWEET WILLIAM.) *Perennial; flowers fascicled;* leaves large, lanceolate; bracts filiform-attenuate, equaling the calyx. — Cultivated, and sparingly spontaneous. (Introd. from Eu.)

4. D. ARMÈRIA L. (DEPTFORD P.) *Annual;* flowers clustered; bractlets of the calyx and *bracts lance-awl-form, herbaceous*, downy, as long as the tube; *leaves* linear, *hairy;* petals small, rose-color with white dots, crenate. — Fields, etc., Mass. to Va., w. to s. Ont., Mich., and Ia. July. (Adv. from Eu.)

PORTULACÀCEAE (PURSLANE FAMILY)

Herbs, with succulent leaves, and essentially regular but unsymmetrical flowers, viz., *sepals fewer than the petals; the stamens opposite the petals when of the same number, but often indefinite; otherwise nearly as* Chickweeds. — Sepals 2. Petals 5, or sometimes none. Stamens mostly 5–20. Styles 2–8, united below, or distinct, stigmatic along the inside. Pod 1-celled, with few or many campylotropous seeds rising on stalks from the base. Embryo curved around mealy albumen. — Insipid and innocent herbs, with entire leaves. Corolla opening only in sunshine, mostly ephemeral, then shriveling.

* Calyx free, persistent.

1. Montia. Petals 3–5, usually unequal, sometimes slightly connate at the base. Stamens as many. Ovules 2 or 3. Roots fibrous.

2. **Claytonia.** Petals and somewhat perigynous stamens 5, equal. Ovules about 6. Perennials with corms or thick caudex.

* * Calyx free, deciduous.

3. **Talinum.** Stamens hypogynous, usually more numerous than the petals. Pod many seeded.

* * * Calyx partly adnate to the ovary.

4. **Portulaca.** Stamens 7–20, perigynous. Pod opening by a lid to which the calyx-lobes are attached.

1. MÓNTIA [Mich.] L.

Sepals 2, persistent. Petals 3–5, usually a little unequal and often connate at the base. Stamens as many, adhering to the base of the petals. Style-branches 3. Ovules few. Seeds 2–3. — Annuals or fibrous-rooted sometimes rhizomatose or stoloniferous perennials, ours with opposite leaves. (Named for *Professor Giuseppe Monti* of Bologna.)

1. **M. fontàna** L. (Blinks.) Small, procumbent, rooting at the nodes; leaves obovate to linear-spatulate, 3–12 mm. long; flowers minute; petals 3, white, scarcely exceeding the calyx, connate at base, unequal, the tube slit down on one side; few-flowered racemes terminal or axillary. — Wet places, along the coast, islands near Mt. Desert, Me. (*Rand*, *Redfield*), to Lab.; and on the Pacific Slope. (Eurasia.)

2. **M. Chamissòi** (Ledeb.) Durand & Jackson. Procumbent or ascending, propagating by slender bulblet-bearing runners; leaves several pairs, oblong-spatulate, 2.5–5 cm. long; petals 5, pale rose-color, much exceeding the calyx. (*Claytonia Chamissonis* Esch.) — Moist ground, Minn.; also Rocky Mts., etc.

3. **M.** perfoliàta (Donn) Howell, with single pair of cauline leaves connate into a suborbicular disk about the stem, is said to be established near Painesville, O. (Introd. from w. N. A.)

2. CLAYTÒNIA [Gronov.] L. Spring Beauty

Sepals 2, ovate, free, persistent. Stamens 5, adhering to the short claws of the petals. Style 3-cleft at the apex. Pod 1-celled, 3-valved, 3–6-seeded. — Perennials, our two species sending up simple stems in early spring from a small deep tuber, bearing a pair of opposite leaves, and a loose raceme of pretty flowers. Corolla rose-color with deeper veins, opening for more than one day! (Named in honor of *Dr. John Clayton*, one of our earliest botanists, who contributed to Gronovius the materials for the Flora Virginica.)

1. **C. virgínica** L. *Leaves linear-lanceolate*, elongated (7–15 cm. long). — Moist open woods, N. S. to Sask., and southw.; common, especially westw. and southw.

2. **C. caroliniàna** Michx. Flowers rather smaller and fewer; *leaves spatulate-oblong or oval-lanceolate* (2.5–5 cm. long). — N. S. to Sask. and Minn., and southw. along the Alleghenies.

3. TALÌNUM Adans.

Sepals 2, distinct and free, deciduous. Petals 5, ephemeral. Stamens 5–∞. Style 3-lobed at the apex. Pod 3-celled at the base when young, 3-valved, with many seeds on a globular stalked placenta. — Ours perennials, subscapose from a thickish rootstock. Leaves linear, subterete, much exceeded by the peduncles. Flowers white or rose-colored, cymose. (Derivation obscure.)

1. **T. parviflòrum** Nutt. Petals 5, pale, 2–3 mm. long; *stamens* 5; capsule ovoid. — Pipestone City, Minn. (*Sheldon*) to Ark., and southwestw.

2. **T. teretifòlium** Pursh. Petals 5, roseate, 8 mm. long; *stamens* 15–20; *anthers oblong;* lobes of the stigma very short; capsule globose. — Serpentine and rarely other rocks, Pa. to Ind., Minn., and southw. June–Aug.

3. **T. rugospérmum** Holzinger. Biennial (?), in appearance closely like the

preceding; stigma-lobes a fourth to a third as long as the style; *anthers short, almost spherical;* seeds roughened. — Prairies, Ind., Wisc., and e. Minn.

4. **T. calycinum** Engelm. Larger; petals usually 8–10; *stamens 30 or more* — Sandy soil or rocks, s. Mo. (*Blankinship*) to Neb. and southwestw.

4. PORTULACA [Tourn.] L. Purslane

Calyx 2-cleft; the tube cohering with the ovary below. Petals 5, rarely 6, inserted on the calyx with the 7–20 stamens, fugacious. Style mostly 3–8-parted. Pod 1-celled, globular, many-seeded, opening transversely, the upper part (with the upper part of the calyx) separating as a lid. — Fleshy annuals, with mostly scattered leaves. (An old Latin name, of unknown meaning.)

1. **P.** oleràcea L. (Common P.) *Prostrate*, very smooth; *leaves obovate* or wedge-form; flowers sessile (opening only in sunny mornings); sepals keeled; petals pale yellow; *stamens* 7–12; *style deeply* 5–6-*parted;* flower-bud flat and acute. — Cultivated and waste grounds; common. — Seemingly indigenous westw. and southwestw. (Nat. from Eu.)

2. **P. neglécta** Mackenzie & Bush, known to us from description only, appears to be a more luxuriant plant with ascending stems, larger leaves (2.5–5 cm. long, 1.2–2.5 cm. broad), and more numerous (15–18) stamens. — Rich bottom lands, Mo. and Kan.

3. **P. retùsa** Engelm. *Leaves often retuse;* calyx-lobes obtuse in the bud; petals small or minute; *style* shorter, 3–4-*cleft;* seeds larger, sharply tuberculate; otherwise like *P. oleracea.* — Ark. to Tex. and westw.; reported from Kan., Ia., and Minn.

4. **P. pilòsa** L. Ascending or spreading, copiously *hairy in the axils; leaves linear-subulate, nearly terete*, 6–12 mm. long; petals red or purple. — Barrens, Mo. and Kan. to Tex., etc.

CERATOPHYLLÀCEAE (Hornwort Family)

Aquatic herbs, with whorled finely dissected leaves, and minute axillary and sessile monoecious flowers without floral envelopes, but with an 8–12-*cleft involucre in place of a calyx, the fertile a simple* 1-*celled ovary, with a suspended orthotropous ovule; seed filled by a highly developed embryo with a very short radicle, thick oval cotyledons, and a plumule consisting of several nodes and leaves.* — Consists only of the genus

1. CERATOPHÝLLUM L. Hornwort

Sterile flowers of 10–20 stamens, with large sessile anthers. Fruit an achene, beaked with the slender persistent style. — Herbs growing under water; the sessile leaves cut into thrice-forked thread-like rigid divisions (whence the name from κέρας, *a horn*, and φύλλον, *leaf*).

1. **C. demérsum** L. Fruit smooth, marginless, beaked with a long persistent style, and with a short spine or tubercle at the base on each side. — Slow streams and ponds, across the continent. (Eu., etc.) Var. echinàtum Gray has the fruit mostly larger (6 mm. long), rough-pimpled on the sides, the narrowly winged margin spiny-toothed. — Similar range.

NYMPHAEÀCEAE (Water Lily Family)

Aquatic perennial herbs, with horizontal rootstocks and peltate or sometimes only cordate leaves floating or emersed; the ovules borne on the sides or back (or when solitary hanging from the summit) of the cells, not on the ventral

suture; the embryo inclosed in a little bag at the end of the albumen next the hilum, except in *Nelumbium*, which has no albumen. Cotyledons thick and fleshy, inclosing a well-developed plumule.—Flowers axillary, solitary. Vernation involute. Rootstocks apparently endogenous.

Subfamily I. NYMPHAEOÍDEAE

Sepals 4–6, and petals numerous in many rows, persistent or decaying away, either hypogynous or variously adnate to the surface of the compound 8–30-celled ovary, which is formed by the union of as many carpels; the numerous ovules inserted over the whole inner face of the cells, except at the ventral suture. Stigmas radiate as in the Poppy. Fruit baccate, with a firm rind. Petioles and peduncles from a (usually thickish) rootstock.

1. **Nymphaea.** Petals (very small and stamen-like) and stamens inserted under the ovary.
2. **Castalia.** Petals adnate to the ovary, large; the stamens on its summit.

Subfamily II. NELUMBONOÍDEAE

Sepals and petals numerous in several rows, passing gradually into each other, and with the indefinitely numerous stamens hypogynous and deciduous. Pistils several, 1-ovuled, separately immersed in the obconical receptacle, which is much enlarged and broadly top-shaped at maturity, the imbedded nut-like fruits resembling small acorns. Embryo large; no albumen.—Petioles and peduncles all from the tuberous rootstock, the centrally peltate leaves and the flowers large.

3. **Nelumbo.** Character of the subfamily.

Subfamily III. CABOMBOÍDEAE

Sepals and petals each 3 or sometimes 4, hypogynous and persistent. Stamens definite (3–18). Pistils 2–18, free and distinct, coriaceous and indehiscent, 1–3-seeded on the dorsal suture.—Stems slender, leafy, coated with mucilage. Flowers small.

4. **Brasenia.** Stamens 12–18. Carpels 4–18. Leaves all peltate.
5. **Cabomba.** Stamens 3–4. Carpels 2–3. Submersed leaves capillary-multifid.

1. NYMPHAÈA [Tourn.] L. Yellow Pond Lily. Spatter-dock

Sepals 5, 6, or sometimes more, roundish, concave. Petals numerous, small and thickish, stamen-like or scale-like, inserted with the very numerous short stamens on the receptacle under the ovary, not surpassing the disk-like 7–24-rayed sessile stigma, persistent and at length recurved. Fruit ovoid, naked, usually ripening above the water. Aril none.—Rootstock creeping, cylindrical. Leaves with a deep sinus at the base. Flowers yellow or sometimes tinged with purple, produced all summer. (Name formerly used for the white-flowered water lilies, dedicated by the Greeks to the Water Nymphs.) Nuphar Sibth. & Sm.

1. N. ádvena Ait. (Cow Lily). *Sepals* 6, *unequal* (yellow, mostly tinged with green or brown); petals shorter than the stamens and resembling them, thick and fleshy, truncate; *stigma nearly entire*, 12–24-*rayed*, *yellow or pale red;* ovary and fruit (3.5–5 cm. long) scarcely contracted above; thin submersed leaves seldom present; floating or emersed and erect *leaves* thick (1.5–3

dm. long), *from roundish to ovate or almost oblong*, the sinus open, lobes subtriangular. (*Nuphar* Ait. f.) — Very common in still or stagnant water, especially from N. Y., southw. and westw. Northw. and northeastw. largely replaced by Var. VARIEGÀTA (Engelm.) Fernald, which has flowers partly purple and leaves with a closed sinus and relatively shorter rounder lobes. (*N. variegata* G. S. Miller.)

× ? **N. rubrodísca** (Morong) Greene. More slender; leaves somewhat smaller (12 dm. long); flowers usually smaller (sepals 2.5–3 cm. long); stigma 9–13-rayed, crenately toothed, bright red or crimson; fruit (2.5 cm. long) decidedly contracted above. (*N. hybrida* Peck; *Nuphar advena*, var. *minus* Morong.) — N. B. to Mich. and Pa. — Probably a hybrid between *N. advena*, var. *variegata* and the next species.

2. **N. microphýlla** Pers. Very slender and with slender rootstock; submersed *leaves thin*, round-reniform, *the floating broadly elliptical*, 3.5–10 *cm. long*, with a *deep narrow sinus; sepals usually* 5; flowers 2.5 cm. or less in diameter; petals spatulate or obovate; *stigmas* 7–10-*rayed*, *dark red;* fruit globular (1.2–1.8 cm. in diameter) with a short neck. (*N. Kalmiana* Sims; *Nuphar* Ait. f.) — N. B. to Pa. and Minn., and northw. — Doubtfully distinct from *N. minima* Reichenb. of Eu.

3. **N. sagittifòlia** Walt. Rootstock stout; *leaves narrowly oblong to oblong-lanceolate* (1.5–3 dm. long), with short sinus; flowers small, 2.5 cm. broad. (*Nuphar* Pursh.) — S. Ind. and Ill. (*Schneck*), and southw.

2. CASTÀLIA Salisb. WATER NYMPH. WATER LILY

Sepals 4, green outside, nearly free. Petals numerous, in many rows, the innermost gradually passing into stamens, imbricately inserted all over the ovary. Stamens indefinite, inserted on the ovary, the outer with dilated filaments. Ovary 12–35-celled, the concave summit tipped with a globular projection at the center, around which are the radiate stigmas; these project at the margin, and are extended into linear and incurved sterile appendages. Fruit depressed-globular, covered with the bases of the decayed petals, maturing under water. Seeds enveloped by a sac-like aril. — Flowers white, pink, yellow, or blue, very showy. (Καστα*λία*, a mythical fountain on Parnassas, sacred to Apollo and the Muses.) NYMPHAEA L. in part.

1. **C. odoràta** (Ait.) Woodville & Wood. (SWEET-SCENTED WATER LILY.) *Rootstock with few and persistent branches;* leaves orbicular (0.5–2.2 dm. wide), deeply-cordate-cleft at the base, the margin entire, often crimson beneath; stipules broadly triangular or almost kidney-shaped, notched at the apex, appressed to the rootstock; *flower* white, *very sweet-scented* (0.5–1.3 dm. in diameter, when fully expanded, opening early in the morning, closing in the afternoon); petals obtuse; anthers blunt; aril much longer than the distinctly stipitate *ellipsoid seeds*, these about 3 mm. long. (*Nymphaea odorata* Ait., including var. *minor* Sims.) — Ponds and still or slow-flowing water; common. June–Sept. Passing to the somewhat ill-defined forma RÒSEA (Pursh) Britton, with pink or bright *pink-red flowers.* — Shallow ponds, mostly near the coast. Var. GIGANTÈA (Tricker) Fernald. Larger; *leaves* 2–4 *dm. broad, the margins turned up; flowers* (white or nearly so) 1–1.5 *dm. in diameter*, less fragrant; sepals greenish. (*Nymphaea odorata*, var. Tricker.) — Del. to Fla. and La. (Mex., W. I., S. A.)

2. **C. tuberòsa** (Paine) Greene. Leaves reniform-orbicular, mostly larger (2–4 dm. wide) and more prominently ribbed than in the last, rarely purplish beneath; *rootstock bearing numerous spontaneously detaching often compound tubers; flower scentless* (or with a slight odor as of apples), white, never pink, 1–2 dm. in diameter, the petals proportionally broader and blunter than in no.1; the fruit more depressed, and with fewer but much larger (*i.e.* twice as broad) *globular-ovoid seeds*, which when mature are barely inclosed by the aril and not stipitate. (*Nymphaea* Paine; *N. reniformis* of auth., not Walt.) — Slow rivers, etc., n. Vt. to Del. (*Commons*), e. Neb., and Ark.

3. NELÚMBO [Tourn.] Adans. Sacred Bean

The only genus of the subfamily. (Name Ceylonese.)

1. **N. lùtea** (Willd.) Pers. (Yellow Nelumbo, Water Chinquapin.) Leaves usually raised high out of the water, circular, 3–6 dm. in diameter, with the center depressed or cupped; flower pale yellow, 1.2–2.5 dm. broad; anthers tipped with a slender hooked appendage. (*Nelumbium luteum* Willd.) — Concord and Osterville, Mass., s. Ct. (probably of Indian introduction) to L. Ontario, L. Erie, Mich., Minn., e. Neb., and southw.; rare in the Middle States. — Tubers farinaceous and edible. Seeds also eatable. Embryo like that of *Castalia* on a large scale; cotyledons thick and fleshy, inclosing a plumule of 1 or 2 well-formed young leaves, inclosed in a delicate stipule-like sheath.

N. nucífera Gaertn., the oriental Lotus, with pink flowers, has become established about Bordentown, N. J., where artificially introduced.

4. BRASÈNIA Schreb. Water Shield

Sepals 3 or 4. Petals 3 or 4, linear, sessile. Stamens 12–18; filaments filiform; anthers innate. Pistils 4–18, forming little club-shaped indehiscent pods; stigmas linear. Seeds 1–2, pendulous on the dorsal suture! — Rootstock creeping. Leaves alternate, long-petioled, centrally peltate, oval, floating. Flowers axillary, small, dull-purple. (Name of uncertain origin.)

1. **B. Schrebèri** Gmel. Leaves entire or shallowly crenate, 2–10 cm. across. (*B. peltata* Pursh.; *B. purpurea* Casp.) — Ponds and slow streams. June–Aug. (Asia, Afr., Austral.)

5. CABÓMBA Aublet.

Sepals 3. Petals 3, oval, bi-auriculate above the very short claw. Stamens 3–6; anthers short, extrorse. Pistils 2–4, with small terminal stigmas. Seeds 3, pendulous. — Slender, mainly submersed, with opposite or verticillate capillary-dissected leaves, a few floating, alternate and centrally peltate. Flowers single on long axillary peduncles. (Probably an aboriginal name.)

1. **C. caroliniàna** Gray. Floating leaves linear-oblong or -obovate, often with a basal notch; flowers 1.2–1.8 cm. broad, white with yellow spots at base; stamens 6. — Ponds, s. Ill. (*Schneck*) to Fla. and Tex. May–Sept.

RANUNCULÀCEAE (Crowfoot Family)

Herbs or sometimes woody plants, with a colorless and usually acrid juice, polypetalous, or apetalous with the calyx often colored like a corolla, hypogynous; the sepals, petals, numerous stamens, and many or few (rarely single) pistils all distinct and unconnected. Flowers regular or irregular. Sepals 3–15. Petals 2–15, or wanting. Stamens indefinite, rarely few. Fruits either dry pods, or seed-like (achenes), or berries. Seeds anatropous (when solitary and suspended the rhaphe dorsal), with hard albumen and a minute embryo. Leaves often dissected, their stalks dilated at the base, sometimes with stipule-like appendages. — A large family, including some acrid-narcotic poisons.

Tribe I. ANEMÒNEAE. Sepals 3–20, often petal-like, imbricated in the bud. Stamens mostly numerous. Achenes numerous or several, in a head or spike. — Herbs, never climbing; leaves alternate or radical, the upper sometimes opposite or whorled.

* Petals evident; sepals usually 5: achenes many.

1. Ranunculus. Petals 5 (or rarely more), yellow or white, with a scale or gland at base. Achenes numerous, capitate. Seed erect or ascending.

2. **Myosurus.** Sepals spurred. Petals 5, white. Achenes in a long spike. Scapes 1-flowered. Seed suspended.
3. **Adonis.** Sepals and petals (5–16, crimson or scarlet) flat, unappendaged. Seed suspended.

* * Petals none; sepals 3–5, caducous; seed erect; leaves alternate.

4. **Trautvetteria.** Achenes numerous, inflated, 4-angled. Flowers corymbose. Filaments white, clavate.

* * * Petals none (rarely some staminodia); seed suspended.

+ Leaves alternate, compound; flowers panicled, often dioecious.

5. **Thalictrum.** Sepals usually 4, petal-like or greenish. Achenes few.

+ + All but the lower leaves opposite or whorled; peduncles 1-flowered.

6. **Anemonella.** Stigma terminal, broad and flat. Radical leaves and involucre compound. Peduncles umbellate. Achenes 4–15, many-ribbed.
7. **Hepatica.** Involucre close to the flower, of 3 oval bracts, calyx-like. Leaves radical, simple and lobed. Pistils several.
8. **Anemone.** Involucre leaf-like, remote from the flower. Leaves compound or dissected. Pistils very many.

Tribe II. CLEMATÍDEAE. Sepals normally 4, petal-like, valvate in the bud, or with the edges bent inward. Petals none, or small. Achenes numerous, tailed with the feathery or hairy styles. Seed suspended. Leaves all opposite.

9. **Clematis.** Climbing by the leafstalks, or erect herbs.

Tribe III. HELLEBÒREAE. Sepals imbricated in the bud, rarely persistent, petal-like. Petals often nectariferous or reduced to staminodia or none. Pods (follicles) or berries (in nos. 21 and 22) few, rarely single, few-many-seeded. Leaves alternate.

* Ovules and commonly seeds more than one pair; herbs.

+ Flowers regular, not racemose; petals reduced to inconspicuous nectaries or slender or none; sepals tardily deciduous.

++ Follicles separate.

10. **Isopyrum.** Petals (in ours) none. Sepals broad, white. Pods few. Leaves compound.
11. **Caltha.** Petals none. Sepals broad, yellow. Leaves kidney-shaped, undivided.
12. **Trollius.** Petals 5–20, narrow, pitted above the base. Pods sessile. Leaves palmately lobed.
13. **Coptis.** Petals 5–6, small, hollowed at apex, white. Pods long-stalked. Leaves radical, trifoliolate.
14. **Helleborus.** Petals small, tubular, 2-lipped. Sepals 5, broad, persistent and turning green. Pods sessile.
15. **Eranthis.** Petals merely small 2-lipped nectaries. Sepals 5–8, narrow, deciduous. Flower solitary, involucrate.

++ ++ Follicles connate.

16. **Nigella.** Petals small, unguiculate, the blade bifid. Sepals 5, regular, petaloid, deciduous.

+ + Sepals and large spur-shaped petals regular, each 5.

17. **Aquilegia.** Pistils 5, with slender styles. Leaves ternately compound.

+ + + Flowers unsymmetrical and irregular; sepals 5.

18. **Delphinium.** Upper sepal spurred. Petals 4, of two forms; the upper pair with long spurs, inclosed in the spur of the calyx.
19. **Aconitum.** Upper sepal hooded, covering the two long-clawed small petals.

+ + + + Flowers regular, racemose; sepals caducous; petals very small, stamen-like, or none; leaves decompound.

20. **Cimicifuga.** Flowers in long often paniculate racemes. Pistils 1–8, becoming many-seeded pods.
21. **Actaea.** Flowers in a single short raceme. Pistil forming a many-seeded berry.

* * Ovules a single pair; flowers regular; rootstocks yellow and bitter.

22. **Hydrastis.** Flowers solitary. Sepals 3, petal-like, caducous. Petals none. Stamens numerous. Pistils several, becoming 2-seeded berries. Leaves simple, lobed.
23. **Zanthorhiza.** Flowers in compound racemes. Sepals 5. Petals 5, small, 2-lobed, with claws. Stamens 5–10. Pods 1-seeded. Shrub with pinnate leaves.

1. RANÚNCULUS [Tourn.] L. Crowfoot. Buttercup.

Annuals or perennials; stem-leaves alternate. Flowers solitary or somewhat corymbed, yellow, rarely white. (Sepals and petals rarely only 3, the latter often more than 5. Stamens occasionally few.) — (A Latin name for a little frog; applied by Pliny to these plants, the aquatic species growing where frogs abound.)

§ 1. FICÀRIA Boiss. *Roots tuberous-thickened; sepals* 3; *petals about* 8, *yellow, with a free scale over the honey gland.*

1. **R.** Ficària L. (Lesser Celandine.) Glabrous and somewhat succulent; leaves basal on long stoutish petioles, ovate, rounded, deeply cordate, subcrenate; flowers scapose, 2 cm. in diameter. (*Ficaria* Karst.) — Wet places, occasional; Mass. to D. C. Apr., May. (Introd. from Eurasia.)

§ 2. BATRÀCHIUM DC. *Petals with a spot or naked pit at base, white, or only the claw yellow; achenes marginless, transversely wrinkled; aquatic or subaquatic perennials, with the immersed foliage repeatedly dissected (mostly by threes) into capillary divisions; peduncles* 1-*flowered, opposite the leaves.*

* *Receptacle hairy.*

2. **R. circinàtus** Sibth. (Stiff Water C.) *Leaves* all under water and *sessile*, with broad conspicuous stipules, the divisions and subdivisions short, spreading in one roundish plane, *rigid, not collapsing when withdrawn from the water.* (*R. divaricatus* auth., not Schrank acc. to Hiern.) — Ponds and slow streams, Vt. to Pa., Ia., northw. and westw., rather rare. (Eu.)

3. **R. aquátilis** L., var. **capillàceus** DC. (Common White Water C.) *Leaves* all under water and mostly *petioled*, their capillary divisions and subdivisions *rather long and soft, usually collapsing more or less when withdrawn from the water;* petiole rather narrowly dilated. (*R. aquatilis*, var. *trichophyllus* Gray; *Batrachium trichophyllum* Bosch; *B. flaccidum* Rupr.; *B. Drouetii* Nym.; and *B. confervoides* auth., not Fries.) — Common, especially in slow-flowing waters, the eastern form with more soft and flaccid leaves. June-Aug. (Eu.) Var. caespitòsus DC. A dwarf terrestrial variety or possibly mere state, rooting at the nodes, the small leaves somewhat fleshy, with broader rigid divisions. — S. Ill. (*Schneck*), and westw. (Eu.)

** *Receptacle glabrous; no submersed leaves.*

4. **R.** hederàceus L. Rooting freely in shallow water; leaves all reniform, angulate-lobed. (*Batrachium* S. F. Gray.) — Fresh-water marshes, Nfd.; s. Md.; s. e. Va. (Nat. from Eu.)

§ 3. HALÒDES Gray. *Petals yellow, with nectariferous pit and scale; carpels thin-walled, striate, in a subcylindric head; scapose, spreading by runners.*

5. **R. Cymbalària** Pursh. (Sea-side C.) Glabrous; scapes 4–22 cm. high, 1–7-flowered; leaves clustered at the root and on the joints of the long rooting runners, roundish-heart-shaped or kidney-shaped, crenate, rather fleshy, long-petioled; petals 5–8. (*Oxygraphis* Prantl.) — Lab. to N. J., also along the Great Lakes and in alkaline soil of the interior. June–Aug. (Greenl., Eurasia.)

Var. **alpinus** Hook. Dwarf; leaves 3-toothed, only 3–6 mm. broad. — Cape Breton I., N. S., e. Que., and northw.

§ 4. EURANÚNCULUS Gray. *Petals with a little scale at the base, yellow; achenes nerveless.*

* *Achenes smooth, or nearly so; mostly perennial.*

+ *Aquatic; immersed leaves filiformly dissected; as in* § Batrachium.

6. **R. delphinifòlius** Torr. (Yellow Water C.) Stems floating or immersed, with the leaves all repeatedly 3-forked into long filiform divisions, or sometimes creeping in the mud (perennial by rooting from the nodes, if at all); petals 5–8, deep bright yellow, 8–12 mm. long, much larger than the sepals;

carpels in a round head, pointed with a straight beak, slightly roughened, and *margined toward the base with a conspicuous tumid border.* (*R. multifidus* Pursh, not Forskål.) — Quiet water, centr. Me. to Ont., s. to N. C. and Ark.; also B. C. to Cal. When rooting out of water or left in the mud of drying ponds it becomes the so called var. TERRÈSTRIS (Gray) Farwell (*R. missouriensis* Greene), a mere state, although differing conspicuously in its firmer less finely cut leaves of roundish outline, pubescent petioles, and smaller flowers.

7. **R. Púrshii** Richards. Wholly immersed and glabrous or creeping upon muddy banks and sparingly to copiously appressed-pubescent; leaves orbicular in outline, 1–2 cm. in diameter (the submersed somewhat larger), radially 3-cleft, the segments again cut into 2–5 rounded lobes; flower about 1 cm. broad; petals bright yellow, not much exceeding the broad similarly colored sepals; *carpels* small, ovoid, turgid, smooth, *without a distinct border;* style short, straightish. — Shallow pools and on shores, e. Que. to Alaska, s. to P. E. I., N. S., N. B., Mich., Minn., N. Dak., and in the Rocky Mts. to N. Mex. June–Sept. (Siber.)

← ← *Arctic species barely entering our northern limits; leaves all 3(–5)-cleft or 3-parted, glabrous.*

8. **R. lappónicus** L. Creeping; leaves deeply 3-parted, 1.5–4 cm. broad, segments obovate, cuspidately several-toothed; scapes 6–10 cm. high, 1-leaved near the base; flower 7–12 mm. broad; petals oblong, yellow with orange veins; achenes somewhat fusiform. (*Anemone nudicaulis* Gray.) — In sphagnum bogs, etc., Greenl. and n. Lab. to the n. shore of L. Superior, n. Minn., and Alaska. (Siber., n. Eu.)

← ← ← *Usually terrestrial but growing in very wet places, glabrous or nearly so; leaves entire or barely toothed, all or else all but the lowest lanceolate or linear; carpels forming a globular head.* (SPEARWORT.)

9. **R. laxicaúlis** (T. & G.) Darby. (WATER PLANTAIN S.) Stems ascending (3–6 dm. long), often rooting from the lower joints; leaves lanceolate or the lowest oblong, mostly denticulate (4–10 cm. long), contracted into a margined half-clasping petiole; petals 5–7, bright yellow, oblong (4–6 mm. long); *carpels* flattened, large (2 mm. long), *pointed with a long narrow-subulate beak.* (*R. obtusiusculus* Raf.?; *R. ambigens* Wats.) — Ditches and muddy places, s. Me. to Ga. and Tenn., chiefly at low altitudes; and from w. N.Y. and s. Ont. to Minn. and Ark. June–Aug. — An aquatic state with reduced but undivided leaves occurs.

10. **R. Flámmula** L. (SMALLER S.) Stem reclining or ascending, rooting below; leaves lanceolate or linear, or the lowest ovate-oblong to lanceolate, entire or nearly so, mostly petioled (2–5 cm. long); petals 5–7, much longer than the calyx, bright yellow; *carpels small, flattish but turgid, mucronate with a short abrupt point.* — Nfd.; also Ore. (Eurasia.) Passing by insensible gradations through an undefinable var. INTERMÈDIUS Hook., into

Var. **réptans** (L.) Mey. (CREEPING S.) Small, slender, the *filiform creeping stems rooting at all the joints;* leaves linear, spatulate, or oblong (6–25 mm. long); flowers small. (*R. reptans* L.) — Gravelly or sandy shores; Nfd. to Pa., northw. and westw. June–Sept. (Eu.) Passing in its turn into the still more slender var. FILIFÓRMIS (Michx.) Hook., with filiform leaves. — Similar situations.

11. **R. oblongifòlius** Ell. Usually annual; stem erect or ascending, often pubescent below, slender (3–6 dm. high), *diffusely branched above and many-flowered; leaves serrate or denticulate,* lower long-petioled, ovate or oblong (1–3.5 cm. long), uppermost linear; flowers 6–10 mm. broad; petals 5, bright yellow (3–6 mm. long); *stamens* 12–20; *carpels* minute, almost *globular,* the small style deciduous. — Swamps and low ground, near the coast, Del. to Fla. and Tex., n. in Miss. basin to Mo. and Ill. Apr.–Sept.

12. **R. pusíllus** Poir. Stem ascending, weak, loosely branching (1.5–4.5 dm. long); *leaves entire* or obscurely denticulate, the lowest round-ovate or heart-shaped (0.7–2 cm. long), long-petioled, the upper oblong or lanceolate (2–4 cm. long); *flowers very small; petals* 1–5, *pale yellowish,* about 2 mm. long, scarcely

surpassing the sepals; stamens 3–10; carpels very turgid, smooth or slightly papillose, tipped with a minute sessile stigma. — Wet places, near the coast, s. N. Y. to Fla. and Tex., n. in the Miss. basin to Mo. and Tenn. Apr.–Sept.

← ← ← ← *Terrestrial, but often in wet places; leaves mostly cleft or divided.*

↔ *Root-leaves (or most of them) not divided to the very base; achenes marginless.*

= *Carpels in a globose head, upon a turgid subglobose receptacle.*

13. R. rhomboídeus Goldie. (Dwarf B.) Low (1–2 dm. high), *hairy; root-leaves roundish or rhombic-ovate*, rarely subcordate, toothed or crenate; lowest stem-leaves similar or 3–5-lobed, the upper 3–5-parted, almost sessile, the lobes linear; *carpels* obovate *with a minute beak*, in a globose head; *petals large*, deep yellow. (*R. ovalis* Raf. ?) — Prairies and dry hills, w. Que. to Mich., Ia., and northw Apr., May.

= = *Carpels in an ovoid or cylindric head, on an elongated receptacle.*

a. Stigma essentially sessile.

1. *Root-leaves all 3-parted or -lobed; the lobes again lobed or toothed.*

14. R. sceleràtus L. (Cursed C.) Annual, glabrous; *root-leaves 3-lobed*, rounded; lower stem-leaves 3-parted, the lobes obtusely cut and toothed, the uppermost almost sessile, with the lobes oblong-linear and nearly entire; *carpels barely mucronulate*, very numerous, *in ellipsoidal or cylindrical heads; petals scarcely exceeding the calyx.* — Wet ditches and bogs; sometimes appearing as if introduced. June–Aug. — Stem thick and hollow; juice acrid and blistering; leaves thickish; flowers small, pale yellow. (Eu.)

2. *Most or all of the root-leaves merely crenate.*

15. R. micránthus Nutt. *Villous;* roots often fusiform-thickened, fasciculate; root-leaves for the most part broadly obovate, scarcely if at all cordate at the base, some of them 3-parted or pedately 3-divided; the cauline subsessile, divided into 3(–5) narrowly oblong leaflets; flowers very small; petals inconspicuous, light yellow; *receptacle glabrous.* (*R. abortivus*, var. Gray.) — Open deciduous woods, s. Me. to the Sask., and southw.

16. R. abortìvus L. (Small-flowered C.) Biennial, slightly succulent; stem 1.5–6 dm. high, covered with a short sparse sometimes fugacious pubescence; primary *root-leaves round-heart-shaped with a wide shallow sinus or kidney-form*, barely crenate, the succeeding often 3-lobed or 3-parted; those of the stem and branches 3–5-parted or divided, subsessile, the divisions oblong or narrowly wedge-form, mostly toothed; *petals pale yellow, shorter than the small reflexed calyx; receptacle villous;* carpels minute, merely mucronulate. — Shady hillsides and along brooks, common. Apr.–June. Fig. 724.

724. R. abortivus. Carpel × 4½.

Var. eùcyclus Fernald. Stem slender, flexuous, not succulent; *root-leaves* larger (often 5–6 cm. broad), *orbicular*, deeply cordate *with a narrow sinus*, thin. — Rich low woods, N. B. and Que. to Ct.

b. Stigma borne on a distinct at first straightish at length more or less recurved style.

17 R. allegheniénsis Britton. Habit and foliage closely as in *R. abortivus; stem glaucous; petals minute, pale yellow; achenes provided with a distinct recurved beak.* — Moist places in rich woods, e. Mass. to Vt., e. N. Y., and southw. to N. C., locally abundant. Fig. 725.

725. R. alleghenìensis. Carpel × 4½.

18. R. Harvèyi (Gray) Britton. Also with the habit and foliage of *R. abortivus;* root a fascicle of fusiform fibers; *petals* 5–8, oblong, 5–7 *mm. in length*, much larger than in the related species preceding; achenes tipped with a weak straightish beak (*R. abortivus*, var. Gray.) — Rocky ground, s. Mo. (*Bush*) and Ark.

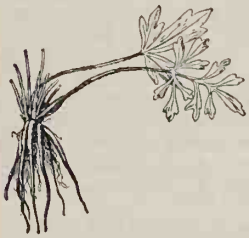
↔ ↔ Leaves variously cleft or divided; achenes in globular or ovoid heads, compressed, with an evident firm margin; hirsute or pubescent.

= Achenes with long recurved beak; root-leaves rarely divided.

19. **R. recurvàtus** Poir. (Hooked C.) Hirsute, 3–6 dm. high; leaves of the root and stem nearly alike, long-petioled, deeply 3-cleft, large; the lobes broadly wedge-shaped, 2–3-cleft, cut and toothed toward the apex; petals shorter than the reflexed calyx, pale. — Woods, common. May, June.

= = Style long and attenuate, stigmatose at the tip, persistent or the upper part usually deciduous; early root-leaves only 3-parted, the later 3–5-foliolate; petals bright yellow.

20. **R. fasciculàris** Muhl. (Early C.) Low, ascending, 1–2.5 dm. high, pubescent with close-pressed silky hairs; *root a cluster of thickened fleshy fibers; radical leaves appearing pinnate*, the long-stalked terminal division remote from the sessile lateral ones, itself 3–5-divided or -parted and 3–5-cleft, the lobes oblong or linear; *petals* often 6 or 7, *spatulate-oblong*, twice the length of the spreading calyx; *carpels scarcely margined*, tipped with a slender straight or rather curved beak. — Dry or moist hills, e. Mass. to Ont. and southw. Apr., May. Fig. 726.



726. R. fascicularis. Base of plant × ½.

21. **R. septentrionàlis** Poir. (Swamp B.) Usually villous; *stems* 3–8 dm. long, erect, *ascending, or in wet ground some of them procumbent or forming long runners;* lower petioles very long; leaves 3-divided, the divisions all stalked (or at least the terminal one), broadly wedge-shaped or ovate, unequally 3-cleft or parted and variously cut; *petals broadly obovate*, much larger than the spreading calyx; *mature carpels* 3–3.4 mm. broad, *strongly margined*, pointed by a stout straightish beak. — Moist or shady places, etc., May–Aug. Fig. 727.

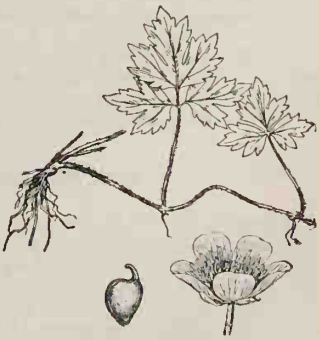
727. R. septentrionalis. Carpel × 4½.

728. R. hispidus. Flower × 5/7. Carpel × 4½.

22. **R. híspidus** Michx. Root a cluster of stout fibers; *stem* 1.5–4 *dm. high, flexuous, not repent*, hirsute or smoothish; leaves 3-divided or the basal only 3-lobed; divisions or lobes variously cleft, teeth mostly acutish; *petals oblong*, bright yellow, much exceeding the spreading sepals mature achenes green, obscurely margined, 2–2.6 mm. broad, tipped with a rather slender beak. — Moist places, chiefly in upland woods, Vt., southw. and westw. Fig. 728. — A smoothish form occurs.

= = = Style short, recurved, stigmatose along the inner margin, mostly persistent.

23. **R. rèpens** L. (Creeping B.) *Creeping*, in habit and foliage closely similar to the last two species; leaves frequently white-variegated or spotted; flowers 2–2.6 cm. broad; sepals not reflexed in anthesis. — In low grounds; generally in ditches and along water courses, near the coast and probably introduced from Europe, but indigenous westw. Fig. 729.



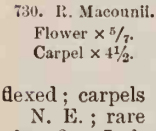
729. R. repens. Base of plant × ½. Flower × 5/7. Carpel × 4½.

24. **R. párvulus** L. Hirsute, *not creeping*, similar to but much smaller than the preceding; leaves rarely over 3 cm. broad;

flowers 1–1.8 cm. in diameter; *sepals reflexed* in anthesis; *head of fruit ovoid; achenes small, flat, strongly margined*, the faces sometimes a little warty; style short, erect. — Waste places, ballast, etc., Philadelphia and southw. (Adv from Eu.)

25. **R. pennsylvánicus** L. f. (Bristly C.) Stout and erect from a usually annual root, hirsute with widely spreading bristly hairs, leafy to the top, 4–6 dm. high; leaves all ternately divided or compound, the stalked *leaflets* unequally 3-cleft, *sharply cut and toothed*, acute; flowers inconspicuous; sepals reflexed; carpels obscurely margined, in a *short-cylindric head; receptacle cylindro-conical.* — Wet places. June–Aug. (Asia.)

26. **R. Macoúnii** Britton. Resembling the last, but the ascending or reclining stems few-leaved, rarely if ever rooting, not always hirsute; petals (about 6 mm. long) surpassing the hardly reflexed and soon deciduous calyx; achenes with a stout straight beak, in a *globose or ovoid head; receptacle thick, obovoid.* (*R. hispidus* Man. ed. 6.) — Que. to L. Superior, "Ia.," and westw. Fig. 730.



730. R. Macounii. Flower × 5/7. Carpel × 4½.

27. **R. bulbòsus** L. (Bulbous C. or B.) Hairy; *stem* (3 dm. high) *erect from a bulb-like base*; radical leaves 3-divided; *the lateral divisions sessile, the terminal stalked* and 3-parted, all wedge-shaped, cleft and toothed; peduncles furrowed; petals round, wedge-shaped at base; calyx reflexed; carpels tipped with a very short beak. — Fields; very abundant only in N. E.; rare westw. May–July. — Leaves appearing as if pinnate. Petals often 6 or 7, deep glossy yellow, the corolla more than 2.5 cm. broad. (Nat. from Eu.)

28. **R. Acris** L. (Tall C. or B.) Hairy; stem erect (6–9 dm. high); leaves 3-divided; *the divisions all sessile* and 3-cleft or parted, their segments cut into lanceolate or linear crowded lobes; peduncles not furrowed; petals obovate, much longer than the spreading calyx. — Fields; common, especially eastw. June–Aug. — Flowers nearly as large as the last, but not so deep yellow. (Nat. from Eu.) Var. Stevèni (Andrz.) Lange. Leaf-segments broadly oblanceolate or even obovate-cuneate. — Moist meadows, N. E. and northeastw.; not rare. (Nat. from Eu.)

** * Achenes beset with rough points or small prickles; annuals.*

29. **R. muricàtus** L. Nearly glabrous; lower leaves roundish or reniform, 3-lobed, coarsely crenate; the upper 3-cleft, wedge-form at the base; *petals longer than the calyx; carpels flat, spiny-tuberculate* on the sides, strongly beaked, surrounded with a wide and sharp smooth unarmed margin. — Wet places, e. Va. and southw. (Nat. from Eurasia.)

30. **R. arvénsis** L. Similar to the preceding, but segments of the cauline leaves more narrow and acute; *carpels armed on the thick border as well as the surfaces.* — Waste places, N. J. to O. (Sparingly adv. from Eu.)

31. **R. parviflòrus** L. Hairy, slender and diffuse; lower leaves roundish-cordate, 3-cleft, coarsely toothed or cut; the upper 3–5-parted; *petals not longer than the calyx; carpels minutely hispid and rough*, beaked, narrowly margined. — Waste places, etc., Md. and Va. to Fla. and Tex. (Nat. from Eu.)

2. MYOSÙRUS [Dill.] L. Mouse-tail

Sepals 5, spurred at the base. Petals 5, small and narrow, raised on a slender claw, at the summit of which is a nectariferous hollow. Stamens 5–20. Achenes numerous, somewhat 3-sided, crowded on a very long and slender spike-like receptacle (whence the name, from μῦς, *a mouse*, and οὐρά, *a tail*), the seed suspended. — Little annuals, with tufted narrowly linear-spatulate root-leaves, and naked 1-flowered scapes. Flowers small, greenish.

1. **M. mínimus** L. Fruiting spike 2–5 cm. long; achenes quadrate, blunt. — Alluvial ground, etc., Ill. to Assina., N. Mex., and Fla.; also at Belleville, Ont. (*Macoun*); and reported from e. Va. (Eu.)

3. ADÒNIS [Dill.] L.

Sepals and petals (5–16) flat, unappendaged, deciduous. Achenes numerous, in a head, rugose-reticulated. Seed suspended. — Herbs with finely dissected alternate leaves and showy flowers. (Ἄδωνις, a favorite of Venus, after his death changed into a flower.)

1. **A. autumnàlis** L. (Pheasant's Eye.) Low leafy annual with scarlet or crimson corolla darker in the center. (*A. annua* L., in part.) — Occasional in fields. (Sparingly introd. from Eu.)

4. TRAUTVETTÈRIA Fisch. & Mey. False Bugbane

Sepals 3–5, usually 4, concave, petal-like, very caducous. Petals none. Achenes numerous, capitate, membranaceous, compressed, somewhat 4-angled and inflated. Seed erect. — A perennial herb, with alternate palmately-lobed leaves, and corymbose white flowers. (For *Prof. E. R. von Trautvetter*, an able Russian botanist of the 19th century.)

1. **T. carolinénsis** (Walt.) Vail. Stems 6–9 dm. high; root-leaves large, 5–11-lobed, the lobes toothed and cut. (*T. palmata* Fisch. & Mey.) — Moist ground along streamlets, Md. and s. w. Pa. to Mo. and Ga.

5. THALÍCTRUM [Tourn.] L. Meadow Rue

Sepals 4–5, petal-like or greenish, usually caducous. Petals none. Achenes 4–15, grooved or ribbed, or else inflated. Stigma unilateral. Seed suspended. — Perennials, with alternate 2–3-ternately compound leaves, the divisions and the leaflets stalked; petioles dilated at base. Flowers in corymbs or panicles, often polygamous or dioecious. (A Greek name of an unknown plant, mentioned by Dioscorides.)

* *Flowers perfect; filaments club-shaped, erect or spreading.*

1. **T. clavàtum** DC. Stem slender, glabrous, 3–4 dm. high, 1–3-leaved; radical leaves biternate; leaflets large, thin, glaucous beneath, suborbicular, coarsely and crenately 3–7-toothed; flowers white, few; achenes 5–10, flat, falcate, tapering into a long and very slender stipe. — By mountain streams, W. Va. and Va. to Ga. and Ala. May, June.

* * *Flowers dioecious or polygamous.*

← *Achenes sessile, regularly ribbed, their walls of firm texture.*

2. **T. confìne** Fernald. Glabrous and glaucous, 3–10 dm. high, from a slender elongate caudex; leaflets often 2–4 cm. broad, suborbicular, veins scarcely prominulous beneath; achenes maturing 2–5, about 8 mm. long including the beak. — Rocky and gravelly banks of streams, e. N. B., Que., and n. Me. to n. N. Y. and Man. June, July.

← ← *Achenes broadly spindle-shaped, conspicuously stalked; filaments thread-like; leaves 3–4-ternate.*

3. **T. coriàceum** (Britton) Small. *Roots* stout, bright *yellow;* common petioles of the stem-leaves more or less developed, the base much dilated and amplexicaul; leaflets broadly obovate to suborbicular, 3–9-toothed or -lobed, pale and glabrous beneath; *style nearly as long as the achene.* — Mts. of Pa. to Ky., N. C., and Tenn.

4. **T. caulophylloìdes** Small. Similar; *roots not yellow;* leaflets commonly large, reniform-suborbicular, broader than long, pale beneath; *style* thickish, often hooked, *about half as long as the achene.* — Mountain slopes and alluvial banks, Md. to Ky. and Tenn.

← ← ← *Achenes sessile or subsessile, thin-walled, the ribs often connected by transverse reticulations; leaves 3–4-ternate.*

→ *Filaments capillary, soon drooping; petioles of the stem-leaves well developed; vernal.*

5. **T. dioícum** L. (Early M.) Smooth and pale or glaucous, 3–6 dm. high; leaves (2–3) all with general petioles; leaflets thin, light green, drooping, suborbicular, 3–7-lobed; flowers dioecious; sepals purplish or greenish white. — Rocky woods, etc., centr. Me., westw. and southw., common. Apr., May.

→ → *Filaments capillary or slightly club-shaped, soon drooping; petioles of the stem-leaves short or none; aestival.*

6. **T. dasycárpum** Fisch. & Lall. Stem 6–12 dm. high, usually purplish; *leaflets* shortly oblong, mostly 3-toothed, more or less veiny, pale and usually covered *with a fine non-glandular pubescence* beneath; flowers dioecious; sepals and capillary filaments commonly purplish white. (*T. purpurascens* Man. ed. 6, in part.) — Alluvial soil, N. J. to the Saskatchewan, and southwestw.

7. **T. revolûtum** DC. Habit and flowers much as in the preceding; *leaflets* thicker, under a lens finely *glandular-puberulent*, the glands or waxy globules sessile or shortly stipitate. (*T. purpurascens* Man. ed. 6, in part, including var. *ceriferum* Aust.) — Rocky upland woods, etc., also on river banks, e. Mass. to N. J., s. w. Ont., s. Ind., and N. C. — Emitting a heavy odor.

→ → → *Filaments club-shaped, ascending or spreading until after anthesis.*

8. **T. polýgamum** Muhl. (Tall M.) Glabrous or pubescent but not glandular, 0.5–2.6 m. high; stem-leaves sessile; leaflets rather firm, roundish to oblong, commonly with mucronate lobes or tips, sometimes puberulent beneath; panicles very compound; flowers white (rarely purplish), the fertile ones with some stamens; anthers not drooping, small, oblong, blunt, the mostly white filaments decidedly thickened upwards; *achenes glabrous.* (*T. Cornuti* Man. ed. 5, not L.) — Wet meadows and along rivulets, Nfd. to O. and southw., common. July–Sept. Var. hebecárpum Fernald. Leaflets usually pubescent beneath; *achenes pubescent.* — Nfd. to s. Ont. and N. H.

6. ANEMONÉLLA Spach.

Involucre compound, at the base of an umbel of flowers. Sepals 5–10, white and conspicuous. Petals none. Achenes 4–15, ovoid, terete, strongly 8–10-ribbed, sessile. Stigma terminal, broad and depressed. — Low glabrous perennial; leaves all radical, compound. (Name a diminutive of *Anemone*, to which this plant has sometimes been referred.)

1. **A. thalictroìdes** (L.) Spach. (Rue Anemone.) Stem and slender petiole of radical leaf (1–3 dm. high) rising from a cluster of thickened tuberous roots; leaves 2–3-ternately compound; leaflets roundish, somewhat 3-lobed at the end, cordate at the base, long-petiolulate, those of the 2–3-leaved 1–2-ternate involucre similar; flowers several in an umbel; sepals oval (1.2 cm. long, sometimes pinkish), not early deciduous. (*Syndesmon* Hoffmannsegg.; *Thalictrum anemonoides* Michx.) — Woods, common, s. N. H. to Minn., Kan., Tenn., and n. w. Fla. — Rarely the sepals, stamens or involucre are variously modified.

7. HEPÁTICA [Rupp.] Hill. Liverleaf. Hepatica

Leaves heart-shaped and 3-lobed, thickish and persistent through the winter, the new ones appearing later than the flowers, which are single, on hairy scapes. (Name from a fancied resemblance to the liver in the shape of the leaves.)

1. **H. tríloba** Chaix. Leaves with 3 ovate obtuse or rounded lobes; those of the involucre also obtuse; sepals 6–12, blue, purplish, or nearly white; achenes several, in a small loose head, ovate-oblong, pointed, hairy. (*H. Hepatica* Karst.) — Woods, common from N. S. to Fla., Mo., and Minn.; more abundant eastw. (Alaska, Eu.)

2. **H. acutíloba** DC. Leaves with 3 ovate and pointed lobes, or sometimes 5-lobed; those of the involucre acute or acutish. (*H. acuta* Britton.) — Woods, w. Que., southw. through w. N. H. to Ga., Mo., and Minn., more abundant westw.; York, Me. (*Bicknell*). — Passes into the preceding.

8. ANEMÒNE [Tourn.] L. Anémone

Sepals few or many, petal-like. Petals none, or in no. 1 resembling abortive stamens. Achenes pointed or tailed, flattened, not ribbed. Seed suspended. — Perennial herbs with radical leaves; those of the stem 2 or 3 together, opposite or whorled, and forming an involucre remote from the flower; peduncles 1-flowered, solitary or umbellate. (The ancient Greek and Latin name, a corruption of *Na'mān*, the Semitic name for *Adonis*, from whose blood the crimson-flowered *Anemone* of the Orient is said to have sprung.)

§ 1. PULSATÍLLA Pers. *Carpels numerous in a head, with long hairy styles which in fruit form feathery tails, as in* Clematis; *flower large, usually with some minute or indistinct gland-like abortive stamens answering to petals.*

1. **A. pàtens** L., var. **Wolfgangiàna** (Bess.) Koch. (Pasque Flower.) Silky-villous; flower erect, solitary; leaves ternately divided, the lateral divisions 2-parted, the middle one stalked and 3-parted; segments of the leaves and sessile involucre deeply cleft into narrowly linear and acute lobes; sepals 5–7, purplish blue to whitish (15–35 mm. long), spreading when in full anthesis. (Var. *Nuttalliana* Gray; *Pulsatilla hirsutissima* Britton.) — Prairies, Wisc., Ill., Tex., northw. and westw. March, Apr. (Eu., Siber.)

§ 2. ANEMÒNE proper. *Styles short, not plumose. Staminodia none.*

* *Achenes densely long-woolly, compressed; involucre far below the flower.*

← *Rootstock tuberous; sepals usually* 10–20; *style filiform.*

2. **A. caroliniàna** Walt. Stem 7–15 cm. high; root-leaves once or twice 3-parted or cleft; involucre 3-parted, its wedge-shaped divisions 3-cleft; sepals 10–20, oblong-linear, purple or whitish; head of fruit ellipsoid. — Dak. to Ill., Fla., and Tex. May. A. decapétala Ard., said to reach e. Kan., is doubtfully distinct, its strongest character being the greater prevalence of simply ternate basal leaves with crenate uncleft leaflets.

← ← *Rootstock not tuberous; sepals usually* 5–8; *styles filiform.*

3. **A. parviflòra** Michx. Stem 1–3 dm. high, from a slender rootstock, 1-*flowered;* root-leaves 3-parted, their broadly wedge-shaped divisions crenate-incised or lobed; involucre 2–3-leaved; sepals 5 or 6, oval, white, with bluish bases; head of fruit globular. — Wet limestone rocks, Lab. to Alaska, s. to e. Que., Ont., Minn., Col., and Ore. May–Sept. (Siber.)

4. **A. multífida** Poir. Stems from a branching caudex, silky-hairy (1–4 dm. high); principal involucre 2–3-leaved, bearing *one naked and one or two 2-leaved peduncles;* leaves of the involucre short-petioled, similar to the root-leaves, twice or thrice 3-parted and cleft, their divisions linear; sepals (sometimes numerous) obtuse, red, greenish yellow or whitish; head of fruit spherical or ovoid. (*A. Hudsoniana* Richards.) — Gravelly and ledgy (calcareous) shores and banks, e. Que. to Alaska, s. to N. B., n. Me., n. Vt., n. N. Y., Mich., S. Dak.; and in the mts. to Ariz. June. (Extra-trop. S. A.)

← ← ← *Taller, commonly branching above or producing two or more peduncles; involucral leaves long-petioled; sepals* 5–8, *silky or downy beneath, oval or oblong; style subulate.* (Thimbleweeds.)

5. **A. cylíndrica** Gray. Slender, pubescent; flowers 2–6, on very long upright *naked peduncles;* involucral leaves twice or thrice as many as the peduncles, 3-divided; their *divisions wedge-lanceolate*, the lateral 2-parted, the middle 3-cleft; lobes cut and toothed at the apex; *sepals* 5, *rather obtuse*, greenish

white; *head of fruit cylindrical* (2–3.5 cm. long). — Rocky woods and dry barrens, w. Me. to Sask., s. to N. J., Pa., Ill., Mo., Kan., N. Mex., and Ariz. May–July.

6. **A. ripària** Fernald. Less conspicuously pubescent; leaflets thinner, greener, less strongly veined; *those of the involucre lanceolate, cuneate at the base;* sepals 5, large (1.5 cm. long), obtuse, white or rarely reddish, mostly petaloid; *head of fruit subcylindric*, the *styles suberect.* — Calcareous river-banks, etc., Gaspé Co., Que., to Alberta, s. to Me., w. Ct., e. Pa., and w. N. Y. May, June.

7. **A. virginiàna** L. Loosely pubescent or glabrate; involucral leaves 3, 3-parted; their *divisions ovate-lanceolate*, pointed, cut-serrate, the lateral 2-parted, the middle 3-cleft; peduncles elongated, the earliest naked, the others with a 2-leaved involucel at the middle, repeatedly proliferous; *sepals* 5, *acute*, greenish (in one variety white and obtuse); *head of fruit ovoid or thick-cylindric, the styles divergent.* — Woods and meadows, centr. Me. to Minn., and southw. June–Aug. — Plant 0.6–1 m. high; the upright peduncles 1.5–3 dm. long.

* * *Achenes naked, orbicular, compressed, wing-margined; sepals* 5, *obovate; involucre sessile.*

8. **A. canadénsis** L. Hairy, rather low; primary involucre 3-leaved, bearing a naked peduncle, and soon a pair of branches or peduncles with a 2-leaved involucre at the middle, which branch similarly in turn; their leaves broadly wedge-shaped, 3-cleft, cut and toothed; radical leaves 5–7-parted or cleft; sepals white (1.2–1.8 cm. long); head of fruit spherical. (*A. pennsylvanica* L.) — River-banks and prairies, e. Que. to Assina., s. to N. S., centr. Me., w. N. E., N. J., Pa., Great Lake region, Mo., Kan., and Col.; escaped from cultivation elsewhere.

* * * *Achenes rather few, nearly naked, ovate-oblong; stems slender,* 1-*flowered; leaves radical.*

9. **A. quinquefòlia** L. (Wood A.) Low, smoothish; stem perfectly simple, from a thick-filiform whitish or brown rootstock; *involucre of* 3 *long-petioled trifoliolate leaves*, their leaflets wedge-shaped or oblong, and laciniately toothed or the lateral ones 2-parted; a similar radical leaf in sterile plants solitary from the rootstock; peduncle not longer than the involucre; sepals 4–7, oval, white, or tinged with purple outside; carpels only 15–20, oblong, with a hooked beak. (*A. nemorosa* of Man. ed. 6, not L.) — Margin of woods. Apr., May. — A delicate vernal species; the flower 2 cm. broad.

The European A. nemoròsa L., with thicker blackish rootstock, has been found as an escape from cultivation in e. Mass. (*Sears*).

10. **A. trifòlia** L. Similar in habit, somewhat stouter; the *leaflets* of the involucre lanceolate to ovate, 2–3 cm. broad, *rather regularly serrate, not incised;* flower 2.8–3.5 cm. in diameter; sepals oval, white. — Woods, mts. of s. Pa. to Ga. (Eu.)

9. CLÉMATIS L. Virgin's Bower

Perennial herbs or vines, mostly a little woody, and climbing by the bending or clasping of the leafstalks, rarely low and erect. (Κληματίς, a name of Dioscorides for a climbing plant with long and lithe branches.)

§ 1. FLÁMMULA DC. *Flowers cymose-paniculate, rather small, in our species dioecious or the pistillate with some sterile stamens. Sepals petaloid, whitish, spreading, thin. Petals none. Anthers short, blunt.*

1. **C. virginiàna** L. Leaves normally 3-foliolate; leaflets ovate, acute, thin, dark green above, when young silky-villous beneath, in age more or less completely glabrate, heart-shaped at the base, variously few-toothed. — River-banks, etc., common; climbing over shrubs. July, Aug. A variation, found in the lower Missouri Valley and having more persistent pubescence and "marginless" achenes, has been described as *C. missouriensis* Rydb.

2. **C. ligusticifòlia** Nutt. Very similar, but the leaves 5-foliolate or quinate-ternate; leaflets small, 1.5–4 cm. broad, pale green, thickish, of firm texture. — Mo. (*Bush*), Neb., and w. to the Pacific.

§ 2. VIÓRNA Reichenb. *Flowers large, solitary on long peduncles, usually nodding. Sepals thick, erect and connivent at base, mostly dull purple. Petals none. Anthers linear.*

* *Stems climbing; leaves at least in part pinnate; calyx (and foliage) glabrous or puberulent.*

← *Tails of fruit plumose.*

3. **C. Viórna** L. (LEATHER FLOWER.) Calyx ovoid and at length bell-shaped; the purplish *sepals* (2–3 cm. long) *very thick and leathery, wholly connivent* or only the tips recurved; long tails of the *fruit very plumose; leaflets* 3–7, ovate or oblong, sometimes slightly cordate, 2–3-lobed or entire, *not reticulated;* uppermost leaves often simple. (*C. glaucophylla* and *C. flaccida* Small.) — Rich soil, Pa. to Mo., and southw. May–Aug.

4. **C. Addisònii** Britton. *Suberect*, 6–9 dm. high; *leaves* all or many of them *simple, sessile*, broadly ovate, deep green above, glaucous beneath, obtuse, the later ones pinnate with prehensile petiolules and elliptic ovate leaflets; flowers and fruit as in *C. Viorna.* — Alluvial soil, Va. (*Addison Brown*), N. C., and Tenn. × C. VIORNIOÌDES Britton is intermediate between this and *C. Viorna.*

5. **C. versícolor** Small. Climbing, glabrous or nearly so; leaves pinnate; *leaflets* oval, *reticulated;* sepals lanceolate, glabrous on the outer surface, slightly recurved at the tip; achenes with plumose tails. — Dry ledges, Mo. (*Bush*), and Ark. (according to Small).

← ← *Tails of fruit silky or glabrate.*

6. **C. Pitchèri** T. & G. Calyx bell-shaped; the dull purplish *sepals with narrow and slightly margined recurved points; tails of the fruit filiform and naked or shortly villous;* leaflets 3–9, ovate or somewhat cordate, entire or 3-lobed, much reticulated; uppermost leaves often simple. (*C. Simsii* of auth., not Sweet according to Gray.) — S. Ind. to Neb. and Tex. June.

7. **C. críspa** L. Calyx cylindrical below, the upper half of the bluish-purple *sepals* (2.5–4 5 cm. long) *dilated* and widely spreading, with *broad and wavy thin margins; tails of the fruit silky* or glabrate; leaflets 5–9, thin, varying from ovate or cordate to lanceolate, entire or 3–5-parted. (*C. cylindrica* Sims.) — Va. near Norfolk, and southw. May–Aug.

* * *Low and erect, mostly simple; flowers solitary, terminal; leaves sessile or nearly so, undivided, strongly reticulated.*

8. **C. ochroleùca** Ait. *Leaves* broadly ovate, entire or sometimes 3-lobed, *silky beneath;* sepals yellowish within; *peduncles long; tails of the fruit tawny-plumose*, the achenes nearly symmetrical, 3.5 mm. broad. — Copses, s. N. Y. to Ga.; rare. May.

9. **C. ovàta** Pursh. Very similar in habit; *leaves* narrowly ovate, entire, *glabrate;* sepals purplish; *achenes oblique*, 4–5 mm. broad, *their silky tails white* or nearly so. — Dry slaty hillsides, White Sulphur Springs, W. Va. to S. C.

10. **C. Fremóntii** Wats. Leaves crowded, thick, often coarsely toothed, sparingly villous-tomentose; *peduncles very short; tails villous or glabrate, not plumose.* — Mo., Neb., and Kan.

§ 3. ATRÁGENE DC. *Some of the outer filaments enlarged and more or less petaloid; peduncles bearing single large flowers; the thin sepals widely spreading.*

11. **C. verticillàris** DC. Woody-stemmed climber, almost glabrous; leaves trifoliolate, with slender common and partial petioles; leaflets ovate or slightly heart-shaped, pointed; flower pinkish-purple, 5–7.5 cm. across; tails of the fruit plumose, 5 cm. long. (*Atragene americana* Sims.) — Rocky

woods, chiefly in calcareous districts, c. Que. to Hudson B. and L. Winnipeg, locally s. to Del., Va., W. Va., Mich. and Minn. May, June.

10. ISOPÝRUM L.

Sepals 5, petal-like, deciduous. Stamens 10–40. Pistils 3–6 or more, pointed with the styles. Pods ovate or oblong, 2–several-seeded. — Slender smooth perennial herbs, with 2–3-ternately compound leaves; the leaflets 2–3-lobed. Flowers axillary and terminal, white. (From *ἰσόπυρον*, the ancient name of a *Fumaria*.)

1. **I. biternàtum** (Raf.) T. & G. Petals none; filaments white, club-shaped; pistils 3–6 (commonly 4), divaricate in fruit, 2–3-seeded; seeds smooth. — Moist shady places, s. Ont. (*Dearness*) to Minn., and southw. May. — Fibers of the root thickened here and there into little tubers.

11. CÁLTHA [Rupp.] L. Marsh Marigold

Sepals 5–9, petal-like. Pistils 5–10, with scarcely any styles. Pods (follicles) compressed, spreading, many-seeded. — Glabrous perennials, with round and heart-shaped or kidney-form large leaves. (An ancient Latin name for the common Marigold.)

1. **C. palústris** L. Stem hollow, furrowed, not creeping; leaves round or kidney-shaped, either crenate or dentate or nearly entire; *sepals* broadly oval, *bright yellow*. — Swamps and wet meadows, Nfd. to Sask., s. to S. C., Tenn., and Neb. Apr.–June. Often called incorrectly *Cowslips;* used as a pot-herb in spring, when coming into flower. (Eu.) Var. flabellifòlia (Pursh) T. & G. is a weak slender form (not creeping), with open reniform leaves and smaller flowers (2 cm. broad or less), occurring in cold mountain springs, N. Y. to Md. Var. radìcans (Forst.) Hartm. is a decumbent or procumbent form, creeping at the base, usually more slender and smaller-flowered than the typical form. — Arctic Am. and (according to Rydberg) in swamps near Woodlawn and W. Hampton, N. Y. (Boreal Eurasia.)

2. **C. nàtans** Pall. Stems commonly floating; leaves ovate-reniform, thin, subentire; flowers small (1–1.2 cm. broad); *sepals white or pinkish;* carpels numerous (3 mm. long), in a globose head. — In ponds or on muddy shores, n. Minn., and northwestw. June–Sept.

12. TRÓLLIUS L. Globeflower

Sepals 5–15, petal-like. Petals small, 1-lipped, the concavity near the base. Stamens and pistils numerous. Pods 9 or more, many-seeded. — Smooth perennials with palmately parted and cut leaves, like *Ranunculus*, and large solitary terminal flowers. (Name a latinization of *Troll* from *Trollblume*, the Germanic vernacular designation.)

1. **T. láxus** Salisb. (Spreading G.) Leaves 5–7-parted; pale greenish-yellow sepals 5–6, spreading; petals 15–25, inconspicuous, much shorter than the stamens. — Deep swamps, w. Ct. to Del., Pa., and Mich.; Rocky Mts. May.

13. CÓPTIS Salisb. Goldthread

Sepals 5–7, petal-like, deciduous. Petals 5–7, small, club-shaped, hollow at the apex. Stamens 15–25. Pistils 3–7, on slender stalks. Pods divergent, membranaceous, pointed with the style, 4–8-seeded. — Low smooth perennials, with ternately divided root-leaves, and small white flowers on scapes. (Name from *κόπτειν, to cut*, alluding to the divided leaves.)

1. **C. trifòlia** (L.) Salisb. Rootstocks of long bright yellow bitter fibers, leaves evergreen, shining; leaflets 3, obovate-wedge-form, sharply toothed, obscurely 3-lobed; scape naked, slender, 7–13 cm. high, 1(rarely 2)-flowered. —

Mossy woods and swamps, Lab. to Alask., s. to Md., mts. of N. C. and Tenn., Mich., and n. e. Ia. May–July. (Grecnl., Eurasia.)

14. HELLÉBORUS [Tourn.] L. Hellebore

Sepals 5, petal-like or greenish, persistent. Petals 8–10, very small, tubular, 2-lipped. Pistils 3–10, sessile, forming coriaceous many-seeded pods. — Perennial herbs, with ample palmate or pedate leaves and large solitary nodding early vernal flowers. (An ancient name of unknown meaning.)

1. **H.** víridis L. (Green H., Christmas Flower.) Root-leaves glabrous, pedate; calyx spreading, greenish. — Has been found wild on L. I., in Pa., N. J., and W. Va. Dec.–Apr. (Nat. from Eu.)

15. ERÁNTHIS Salisb. Winter Aconite

Sepals 5–8, petal-like, deciduous. Petals small 2-lipped nectaries. Carpels few, stipitate, several-seeded. — Perennial herbs, with palmately multifid radical leaves, the scape bearing a single large yellow flower surrounded by an involucre of a single leaf. (Name from ἦρ, *spring*, and ἄνθος, *flower*.)

1. **E.** hyemàlis (L.) Salisb. Dwarf; flowers cup-shaped, shorter than the stamens. (*Cammarum* Greene.) — Often cultivated; established in e. Pa. Feb., March. (Nat. from Eu.)

16. NIGÉLLA [Tourn.] L. Fennel Flower

Sepals 5, regular, petaloid. Petals small, ungeniculate, the blade bifid. Pistils 5, partly united into a compound ovary, so as to form a several-celled capsule. — An Old World genus, with blackish aromatic seeds, noteworthy in the family in having a somewhat *compound ovary*. (Name a diminutive of *niger*, black, from the color of the seeds.)

1. **N.** damascèna L. (Love-in-a-Mist.) Flower bluish, overtopped by a finely divided leafy involucre. — Sometimes cultivated, and occasionally spontaneous around gardens. (Introd. from Eurasia.)

17. AQUILÈGIA [Tourn.] L. Columbine

Sepals 5, regular, colored like the petals. Petals 5, all alike, with a short spreading lip, produced backward into large hollow spurs, much longer than the calyx. Pistils 5, with slender styles. Pods erect, many-seeded. — Perennials, with 2–3-ternately compound leaves, the leaflets lobed. Flowers large and showy, terminating the branches. (Name of doubtful origin.)

1. **A.** canadénsis L. (Wild C.) Flowers 5 cm. long, scarlet, yellow inside, nodding, so that the spurs turn upward, but the stalk becoming upright in fruit; spurs nearly straight; stamens and styles longer than the ovate sepals. — Rocks, open woods, etc. Apr.–June. Var. Phippènii J. Robinson with salmon-colored flowers, and var. flaviflòra (Tenney) Britton with yellow flowers, are color forms with paler foliage. A. coccínea Small — robust and with acuminate sepals 13–21 mm. long — is a more or less marked and perhaps distinct species of the South and West.

2. **A.** vulgàris L. (Garden C.) Flowers blue, purple, pink, or white; spurs hooked. — Established in many places, especially northw. (Introd. from Eu.)

18. DELPHÍNIUM [Tourn.] L. Larkspur

Sepals 5, irregular, petal-like; the upper one prolonged into a spur at the base. Petals 4 (rarely only 2, united into one), irregular, the upper pair continued backward into long spurs which are inclosed in the spur of the calyx, the lower pair with short claws. Pistils 1–5, forming many-seeded pods in fruit. — Leaves palmately divided or cut. Flowers in terminal racemes. (Name

from *Delphin*, in allusion to the shape of the flower, which is sometimes not unlike the classical figures of the dolphin.)

Introduced annuals; pistil 1.
- Follicle 1 cm. long, glabrous . . . . . 1. *D. Consolida.*
- Follicle 1.2–2 cm. long, pubescent . . . . . 2. *D. Ajacis.*

Indigenous perennials; pistils 3.
- Roots short, tuberous; pods strongly divergent . . . . 3. *D. tricorne.*
- Roots elongated, woody; pods nearly or quite erect.
  - Flowers purplish blue.
    - Petals bearded with yellow hairs; inflorescence loose, pyramidal; plant glabrous . . . . . 4. *D. Treleasei.*
    - Petals bearded with white hairs; racemes virgate.
      - Stem glabrous . . . . . 5. *D. exaltatum.*
      - Stem velvety-pubescent . . . . . 6. *D. Nortonianum.*
  - Flowers sky-blue; raceme lax, few-flowered . . . . . 7. *D. azureum.*
  - Flowers white or nearly so; raceme virgate . . . . . 8. *D. Penardi.*

1. **D. Consólida** L. (Field L.) Leaves dissected into narrow linear lobes; inflorescence loosely paniculate; pedicels shorter than the bracts; pod glabrous. — Old grain-fields, and sparingly along roadsides, N. J., southw. and westw., rare. (Nat. from Eu.)

2. **D. Ajàcis** L. Flowers more numerous and spicately racemose; pods pubescent. — Fields, roadsides, and wet places, Vt. to Mo. and N. C. June–Aug. (Nat. from Eu.)

3. **D. tricórne** Michx. (Dwarf L.) Root a tuberous cluster; stem simple, 1.5–9 dm. high; leaves deeply 5-parted, their divisions unequally 3–5-cleft; the lobes linear, acutish; *raceme few-flowered, loose;* flowers bright blue, sometimes white, occasionally numerous; spur straightish, ascending; *pods strongly diverging.* — W. Pa. to Minn., Neb., and southw. Apr., May.

4. **D. Treleàsei** Bush. Essentially glabrous throughout, 7–10 dm. high, loosely branching; leaf-segments deeply cleft, the lobes long, linear, acute; *lower pedicels much elongated*, often 10–14 cm. in length; calyx rich bluish purple; the lamina of each sepal more or less distinctly spotted with yellow or brown; *petals with a conspicuous yellow beard.* — Barrens of s. Mo. (*Bush*). May, June.

5. **D. exaltàtum** Ait. (Tall L.) Stems slender, 6–15 dm. high; leaves deeply 3–5-cleft, the divisions narrowly wedge-form, diverging, 3-cleft at the apex, acute; *racemes wand-like*, panicled, *many-flowered;* flowers purplish blue, downy; spur straight; *pods erect.* (*D. urceolatum* of auth., not Jacq.) — Rich soil, Pa. to Minn., Neb., and southw. July.

6. **D. Nortoniànum** Mackenzie & Bush. Erect, simple, 8 dm. high; stem leafy, covered with copious spreading yellowish and somewhat viscid pubescence; leaf-segments deeply cleft, the *lobes narrowly linear*, acutish; *raceme single, wand-like*, the *lower pedicels scarcely longer than the upper;* flowers bluish purple; the *spur erect* or nearly so. — Barrens of the Ozark Mts., s. Mo. (*Bush*). May, June.

7. **D. azùreum** Michx. Stem 3–6 dm. high, finely cinereous-pubescent; leaves deeply 3–5-parted, the divisions 2–3 times cleft; the lobes all narrowly linear; *flowers sky-blue; spur ascending or horizontal*, usually curved upward; *pods erect.* (? *D. carolinianum* Walt.) — Va., N. C. and Ga. to Ark., Mo., Minn., and Sask. May, June.

8. **D. Penárdi** Huth. Simple, erect, pubescent and generally glandular; raceme strict, elongated; *flowers numerous, white or nearly so, soft-pubescent;* the spur chiefly ascending or erect. (*D. camporum* Greene; *D. albescens* Rydb.) — Prairies and open deciduous woods, Ill. and Wisc. to N. Mex. and the Rocky Mts.

19. ACONÌTUM [Tourn.] L. Aconite. Monkshood. Wolfsbane

Sepals 5, petal-like, very irregular; the upper one (helmet) hooded or helmet-shaped, larger than the others. Upper petals 2, consisting of small spur-shaped bodies raised on long claws and concealed under the helmet; other petals 6 or fewer, much reduced or wholly wanting. Pistils 3–5. Pods several-seeded.

Seed-coat usually wrinkled or scaly. — Perennials, with palmately cleft or dissected leaves, and showy flowers in racemes or panicles. (The ancient Greek and Latin name, of uncertain origin.)

1. **A. noveboracénse** Gray. Erect from tuberous-thickened roots, high, leafy, *the summit and* strict loosely flowered *raceme pubescent;* leaves rather deeply parted, the broadly cuneate divisions 3-cleft and incised; flowers blue; *the helmet gibbous-obovoid* with broad rounded summit and short descending beak. — Chenango, Orange, and Ulster Cos., N. Y.; also Summit Co., O.; and reported from Allamakee Co., Ia. (*Pammel*).

2. **A. uncinàtum** L. (Wild M.) Glabrous; *stem slender, from tuberous-thickened roots, erect,* but weak and disposed to climb; *leaves firm, deeply* 3–5-*lobed,* petioled, the lobes ovate-lanceolate, coarsely toothed; *flowers blue; helmet erect, obtusely conical,* compressed, slightly beaked in front. — Rich shady soil along streams, Pa., and southw. in the mts.; Wisc. June–Aug.

3. **A. reclinàtum** Gray. (Trailing W.) Glabrous; stems trailing, 1–3 m. long; *leaves deeply* 3–7-*cleft,* petioled, the lower orbicular in outline, 12–15 cm. wide; the divisions wedge-form, incised, often 2–3-lobed; *flowers white,* 1.8 cm. long, nearly glabrous, in very loose panicles; *helmet soon horizontal, elongated-conical,* with a straight beak in front. — Cheat Mt., Va., and southw. in the Alleghenies. Aug.

20. CIMICÍFUGA L. Bugbane

Sepals 4 or 5, falling off soon after the flower expands. Petals, or rather transformed stamens, 1–8, small, on claws, 2-horned at the apex. Stamens as in *Actaea.* Pistils 1–8, forming dry dehiscent pods in fruit. — Perennials, with 2–3-ternately divided leaves, the leaflets cut-serrate, and white flowers in elongated wand-like racemes. (Name from *cimex,* a bug, and *fugere,* to drive away.)

§ 1. ACTINÓSPORA (Turcz.) B. & H. *Pistils* 3–8, *stipitate; seeds flattened laterally, covered with chaffy scales, in one row in the membranaceous pods; style awl-shaped; stigma minute.*

1. **C. americàna** Michx. (American B.) Stem 6–12 dm. high; racemes slender, panicled; ovaries mostly 5, glabrous; pods flattened, veiny, 6–8-seeded. — Watkins, N. Y. (according to Britton); mountains of s. Pa., and southw. Aug.–Sept.

§ 2. MACRÒTRYS (Raf.) T. & G. (as Macrotys) *Pistil solitary or sometimes* 2–3, *sessile; seeds smooth, flattened and packed horizontally in the pod in two rows, as in* Actaea; *stigma broad and flat.*

2. **C. racemòsa** (L.) Nutt. (Black Snakeroot, Black Cohosh.) Stem 1–2.6 m. high, from a thick knotted rootstock; leaves 2–3-ternately and then often quinately compound; leaflets subcuneate to subcordate at the base; racemes in fruit becoming 3–9 dm. long; pods ovoid. — Rich woods, s. N. E. to Wisc., and southw.; cultivated and escaped eastw. July. Var. dissécta Gray. Leaves irregularly pinnately decompound, the rather small leaflets incised. — Local, s. w. Ct. (*Eames*) to Del. (*Commons*).

Var. **cordifòlia** (Pursh) Gray. Leaflets few (about 9), very large (1–2.5 dm. long), at least the terminal one deeply cordate. (*C. cordifolia* Pursh.) — Damp woods, mts. of s. w. Va. to N. C. and Tenn. — Said to flower later than the typical form.

21. ACTAÈA L. Baneberry. Cohosh

Sepals 4 or 5, falling off when the flower expands. Petals 4–10, small, flat, spatulate, on slender claws. Stamens numerous, with slender white filaments. Pistil single; stigma sessile, depressed, 2-lobed. Seeds smooth, flattened, and packed horizontally in 2 rows. — Perennials, with ample 2–3-ternately compound leaves, the ovate leaflets sharply cleft and toothed, and a short and thick ter-

minal raceme of white flowers. (From ἀκτέα, *actaea*, ancient names of the Elder, transferred by Linnaeus.)

1. A. rûbra (Ait.) Willd. (Red B.) *Raceme ovoid;* petals rhombic-spatulate, much shorter than the stamens; *pedicels slender; berries cherry-red,* poisonous, ovoid-ellipsoid. (*A. spicata*, var. Ait.) — Rich woods, common, especially northw. Apr., May. A form with decompound leaves and incised leaflets is var. dissécta Britton. — Lincoln Co., Ont. Forma neglécta (Gillman) Robinson has white berries on long slender green pedicels. (*A. neglecta* Gillman; *A. eburnea* Rydb.) — Not rare. — Worthy of further study and perhaps distinct.

2. A. álba (L.) Mill. (White B.) Leaflets more incised and sharply toothed; *raceme ellipsoid; petals slender*, mostly truncate at the end, appearing to be transformed stamens; *pedicels thickened in fruit*, as large as the peduncle and red, the globular-ovoid *berries white.* — Rich woods, flowering a week or two later than the other, and more common westward and southward.

22. HYDRÁSTIS Ellis. Orange-root. Yellow Puccoon

Pistils 12 or more in a head, 2-ovuled; stigma flat, 2-lipped. Ovaries becoming a head of crimson 1–2-seeded berries in fruit. — A low perennial herb, sending up in early spring, from a thick and knotted yellow rootstock, a single radical leaf and a simple hairy stem, which is 2-leaved near the summit and terminated by a single greenish white flower. (Name unmeaning.)

1. H. canadénsis L. (Golden Seal.) Leaves rounded, heart-shaped at the base, 5–7-lobed, doubly serrate, veiny, when full grown in summer 1–2 dm. wide. — Rich woods, w. N. E. to Minn., and southw. Apr., May.

23. ZANTHORHÌZA L'Hér. Shrub Yellow-root

Sepals 5, regular, spreading, deciduous. Pistils 5–15, with 2 pendulous ovules. Pods 1-seeded, oblong, the short style becoming dorsal. — A low shrubby plant; the bark and long roots deep yellow and bitter. Flowers polygamous, brown-purple, in compound drooping racemes, appearing along with the 1–2-pinnate leaves from large terminal buds in early spring. (Name compounded of ξανθός, *yellow*, and ῥίζα, *root.*) Xanthorrhiza Marsh., a better but later form.

1. Z. apiifòlia L'Hér. Stems clustered, 3–6 dm. high; leaflets cleft and toothed. — Shady banks of streams, Pa. and s. w. N. Y. to Ky. and Ga.

MAGNOLIÀCEAE (Magnolia Family)

Trees or shrubs, with the leaf-buds covered by membranous stipules, polypetalous, hypogynous, polyandrous, polygynous; the calyx and corolla colored alike, in three or more rows of three, and imbricated (rarely covolute) in the bud. — Sepals and petals deciduous. Anthers adnate. Pistils many, mostly packed together and covering the prolonged receptacle, cohering with each other, and in fruit forming a sort of fleshy or dry cone. Seeds 1 or 2 in each carpel, anatropous; albumen fleshy; embryo minute. — Leaves alternate, not toothed, marked with minute transparent dots, feather-veined. Flowers single, large. Bark aromatic and bitter.

1. MAGNÒLIA L.

Sepals 3. Petals 6–9. Stamens imbricated, with very short filaments, and long anthers opening inward. Pistils coherent, forming a fleshy and rather woody cone-like red fruit; each carpel at maturity opening on the back, from which the 1 or 2 berry-like seeds hang by an extensile thread. (Named for *P. Magnol*, professor of botany at Montpellier in the 17th century.)

* *Leaves all scattered along the branches; leaf-buds silky.*

1. **M. virginiàna** L. (SMALL OF LAUREL M., SWEET BAY.) *Leaves* oval to broadly lanceolate, 8–15 cm. long, *obtuse, glaucous beneath; flower globular, white*, 5 cm. long, *very fragrant;* petals broad; cone of fruit small, ellipsoid. (*M. glauca* L.) — Swamps, from near Cape Ann and N. Y. southw., near the coast; in Pa. as far w. as Cumberland Co. May–July. — Shrub 1–6 m. high, with thickish leaves, which farther south are evergreen.

2. **M. acuminàta** L. (CUCUMBER TREE.) *Leaves thin, oblong, pointed, green* and a little pubescent beneath, 13–25 cm. long; *flower slender-bell-shaped, glaucous-green* tinged with yellow, 5 cm. long; cone of fruit 5–7 cm. long, cylindrical. — Rich woods, w. N. Y. to Ill., Ark. and southw. May, June. — Tree 18–27 m. high; fruit when young slightly resembling a small cucumber.

3. **M. macrophýlla** Michx. (GREAT-LEAVED M.) *Leaves obovate-oblong, cordate* at the narrowed base, pubescent and *white beneath; flower open-bell-shaped, white, with a purple spot at base;* petals ovate, 15 cm. long; cone of fruit ovoid. — Ky., Ark., and southw. May, June. — Tree 6–12 m. high; leaves 3–9 dm. long, somewhat clustered on the flowering branches.

** *Leaves crowded on the summit of the flowering branches in an umbrella-like circle; leaf-buds glabrous; flowers white, slightly scented.*

4. **M. tripétala** L. (UMBRELLA TREE.) *Leaves obovate-lanceolate, pointed at both ends*, soon glabrous, 3–6 dm. long; petals 9–12 cm. long. (*M. Umbrella* Desr.) — S. Pa. to Ky., Mo., and southw. May. — Small tree.

5. **M. Frasèri** Walt. (EAR-LEAVED UMBRELLA TREE.) *Leaves oblong-obovate or spatulate, auriculate at the base*, glabrous, 2–5 dm. long; petals obovate-spatulate, with narrow claws, 1 dm. long. — Swamps and along streams, Va. and Ky., along the Alleghenies, and southw. May. — A slender tree 9–15 m. high.

2. LIRIODÉNDRON L. TULIP TREE

Sepals 3, reflexed. Petals 6, in two rows, making a bell-shaped corolla. Anthers linear, opening outward. Pistils flat and scale-form, narrow, imbricating and cohering in an elongated cone, dry, falling away whole, like a samara or key, indehiscent, 1–2-seeded in the small cavity at the base. (Name from λίριον, *lily* or *tulip*, and δένδρον, *tree*.)

1. **L. Tulipífera** L. — Leaves very smooth, with 2 lateral lobes near the base, and 2 at the apex, which appears as if cut off abruptly by a broad shallow notch; petals 5 cm. long, greenish yellow marked with orange; cone of fruit 7.5 cm. long. — Rich soil, Worcester Co., Mass., to Ont., Wisc., and southw. May, June. — A most beautiful tree, sometimes 40 m. high and 2–3 m. in diameter in the Western and Southern States, the timber commonly called POPLAR or WHITE WOOD.

CALYCANTHÀCEAE (CALYCANTHUS FAMILY)

Shrubs with opposite entire leaves, no stipules, the sepals and petals similar and indefinite, the anthers adnate and extrorse, and the cotyledons convolute; the fruit like a rose-hip. Chiefly represented by the genus

1. CALYCÁNTHUS L. CAROLINA ALLSPICE

Calyx of many sepals, united below into a fleshy inversely conical cup (with some leaf-like bractlets growing from it); the lobes lanceolate, mostly colored like the petals, which are similar, in many rows, thickish, inserted on the top of the closed calyx-tube. Stamens numerous, inserted just within the petals, short; some of the inner ones sterile (destitute of anthers). Pistils several or many, inclosed in the calyx-tube, inserted on its base and inner face. — Aromatic shrubs with brownish purple flowers terminating leafy shoots. (Name composed of κάλυξ, *a cup* or *calyx*, and ἄνθος, *flower*.) BUTNERIA Duham.

1. **C. flóridus** L. *Leaves oval, soft-downy underneath;* flowers when crushed yielding somewhat the fragrance of strawberries. (*Butneria* Britton.)—Va. (?) and southw., on hillsides in rich soil; common in gardens. Apr.–Aug.

2. **C. fértilis** Walt. *Leaves oblong* or ovate, thin, either blunt or taper-pointed, *bright green and glabrous* on both sides, or pale beneath; flowers inodorous. (*C. glaucus* and *laevigatus* Willd.; *Butneria fertilis* Britton.)—Franklin Co., Pa. (*Porter*), and southw. along the Alleghenies. May–Aug.

ANONÀCEAE (Custard Apple Family)

Trees or shrubs, with naked buds and no stipules, a calyx of 3 sepals, and a corolla of 6 thickish petals in two rows, valvate in the bud, hypogynous, polyandrous.—Anthers adnate, extrorse; filaments very short. Pistils several or many, separate or cohering in a mass, fleshy or pulpy in fruit. Seeds anatropous, large, with a minute embryo at the base of the *ruminated* albumen.—Leaves alternate, entire, feather-veined. Flowers axillary, solitary. Tropical, excepting

1. ASÍMINA Adans. North American Papaw

Petals 6, increasing after the bud opens; the outer set larger than the inner. Stamens numerous in a globular mass. Pistils few, ripening 1–4 large thick-cylindric pulpy fruits; seeds several, horizontal, flat, inclosed in a fleshy aril.—Shrubs or small trees with unpleasant odor when bruised; the lurid flowers solitary from the axils of last year's leaves. (Name from *Asiminier*, of the French colonists, from the Indian name *assimin*.)

1. **A. tríloba** Dunal. (Common P.) Leaves thin, obovate-lanceolate, pointed; petals dull purple, veiny, round-ovate, the outer ones 3–4 times as long as the calyx.—Banks of streams in rich soil, N. J. to L. Erie, Mich., n. e. Ia., s. e. Neb., and southw. Apr., May.—Tree 3–12 m. high, the young shoots and expanding leaves clothed with a rusty down, soon glabrous. Flowers appearing with the leaves, 3–4 cm. wide. Fruits 7–13 cm. long, green or at length dark brown, the pulp sweet and edible in autumn.

MENISPERMÀCEAE (Moonseed Family)

Woody climbers, with palmate or peltate alternate leaves, no stipules, the sepals and petals similar, in three or more rows, imbricated in the bud; hypogynous, dioecious, 3–6-gynous; fruit a 1-seeded drupe, with a large or long curved embryo in scanty albumen.—Flowers small. Stamens several. Ovaries nearly straight, with the stigma at the apex, but often incurved in fruiting so that the seed and embryo are bent into a crescent or ring. Chiefly a tropical family.

* Sepals and petals present; anthers 4-celled; seed incurved.

1. **Cocculus.** Stamens, petals, and sepals each 6.
2. **Menispermum.** Stamens 12–24, slender. Petals 6–8.

** Petals none; anthers 2-celled; seed saucer-shaped.

3. **Calycocarpum.** Stamens in the sterile flowers 12; in the fertile flowers 6, abortive.

1. CÓCCULUS DC.

Sepals, petals, and stamens 6, alternating in threes, the two latter short. Anthers 4-celled. Pistils 3–6 in the fertile flowers; style pointed. Drupe and seed as in *Menispermum*.—Flowers in axillary racemes or panicles. (An old name, a diminutive of *coccus*, κόκκος, a berry.)

1. **C. carolinus** (L.) DC. Minutely pubescent; leaves downy beneath, ovate or cordate, entire or sinuately or hastately lobed, variable in shape; flowers

greenish, the petals in the sterile ones auriculate-inflexed below around the filaments; drupe red (as large as a small pea). (*Cebatha* Britton.) — River banks, Va. to s. Ill., Kan., and southw. July, Aug.

2. MENISPÉRMUM [Tourn.] L. Moonseed

Sepals 4–8. Petals 6–8, short. Stamens 12–24 in the sterile flowers, as long as the sepals; anthers 4-celled. Pistils 2–4 in the fertile flowers, raised on a short common receptacle; stigma broad and flat. Drupe globular, the mark of the stigma near the base, the ovary in its growth after flowering being strongly incurved so that the (wrinkled and grooved) laterally flattened stone takes the form of a large crescent or ring. The slender embryo therefore is horseshoe-shaped; cotyledons filiform. — Flowers white, in small and loose axillary panicles. (Name from *μήνη*, *moon*, and *σπέρμα*, *seed*.)

1. **M. canadénse** L. Leaves peltate near the edge, 3–7-angled or -lobed. — Banks of streams, w. Que. and w. N. E., westw. and southw. June, July. — Drupes black with a bloom, ripe in September, looking like frost grapes.

3. CALYCOCÁRPUM Nutt. Cupseed

Sepals 6, petaloid. Petals none. Stamens 12 in the sterile flowers, short; anthers 2-celled. Pistils 3, spindle-shaped, tipped with a radiate many-cleft stigma. Drupe globular; thin crustaceous putamen hollowed out like a cup on one side. Embryo foliaceous, heart-shaped. — Flowers greenish white, in long racemose panicles. (Name from *κάλυξ*, *a cup*, and *καρπός*, *fruit*.)

1. **C. Lyòni** (Pursh) Nutt. Leaves large, thin, deeply 3–5-lobed, cordate at the base; the lobes acuminate; drupe 2.5 cm. long, black when ripe. — Rich soil, Ky. to s. Ill., Kan., and southw. May. — Climbing to the tops of trees.

BERBERIDÀCEAE (Barberry Family)

Shrubs or herbs, with the sepals and petals both imbricated in the bud, usually in two rows of 3 (*rarely* 2 *or* 4) *each; the hypogynous stamens as many as the petals and opposite to them; anthers opening by* 2 *valves or lids hinged at the top.* (*Podophyllum* is an exception in having more numerous stamens, the anthers opening along the sides; *Jeffersonia*, in having the sepals in one row.) *Pistil single.* — Filaments short. Style short or none. Fruit a berry or a pod. Seeds few or several, anatropous, with albumen. Embryo small, except in *Berberis*. Leaves alternate, with dilated bases or stipulate.

* Petals 6–9; stamens 8–18; fruit many-seeded; herbs.

1. **Podophyllum.** Petals 6–9. Stamens 12–18; anthers not opening by uplifted valves. Fruit a large berry.
2. **Jeffersonia.** Petals and stamens usually 8; anthers opening by uplifted valves. Pod opening by a lid.

** Petals and stamens 6; fruit few-seeded.

3. **Diphylleia.** Herb with white flowers; petals much longer than the sepals. Berry 2–4-seeded.
4. **Caulophyllum.** Herb with greenish flowers; petals thick, much shorter than the sepals. Ovary soon bursting; the two seeds left naked.
5. **Berberis.** Shrubs, with yellow flowers and wood; a pair of glandular spots on the base of each petal. Fruit a berry.

1. PODOPHÝLLUM L. May Apple. Mandrake

Flower-bud with three green bractlets, which early fall away. Sepals 6, fugacious. Petals 6 or 9, obovate. Stamens twice as many as the petals in our species; anthers linear-oblong, not opening by uplifted valves. Ovary ovoid;

stigma sessile, large, thick and undulate. Fruit a large fleshy berry. Seeds covering the very large lateral placenta, in many rows, each seed inclosed in a pulpy aril. — Perennial herbs, with creeping rootstocks and thick fibrous roots. Stems 2-leaved, 1-flowered. (Name from πούς, *a foot*, and φύλλον, *a leaf*, probably referring to the stout petioles.)

1. **P. peltàtum** L. Stamens 12–18; leaves 5–9-parted, the lobes oblong, rather wedge-shaped, somewhat lobed and toothed at the apex. — Rich woods, w. Que. and w. N. E. to Minn., and southw. May. — Flowerless stems terminated by a large round 7–9-lobed leaf, peltate in the middle, like an umbrella; flowering stems bearing two one-sided leaves, and a nodding white flower from the fork; fruit ovoid, 2.5–5 cm. long, ripe in July, sweet and slightly acid, edible.

2. JEFFERSÒNIA B. S. Barton. Twinleaf

Sepals 4, fugacious. Petals 8, oblong, flat. Stamens 8; anthers oblong-linear, on slender filaments. Ovary ovoid, soon gibbous, pointed; stigma 2-lobed. Pod pear-shaped, opening halfway round horizontally, the upper part making a lid. Seeds many, in several rows on the lateral placenta, with a fleshy lacerate aril on one side. — A perennial glabrous herb, with matted fibrous roots, long-petioled root-leaves parted into 2 half-ovate leaflets, and simple naked 1-flowered scapes. (Named in honor of *Thomas Jefferson.*)

1. **J. diphýlla** (L.) Pers. Low; flower white, 2.5 cm. broad, the parts rarely in threes or fives. (*J. binata* B. S. Barton.) — Woods, n. N. Y. to Wisc., n. e. Ia., and southw. Apr., May. — Called Rheumatism Root in some places.

3. DIPHYLLÈIA Michx. Umbrella Leaf

Sepals 6, fugacious. Petals 6, oval, flat. Stamens 6. Ovary ellipsoid; stigma depressed, subsessile. Ovules 5 or 6, attached to one side of the cell below the middle. Berry globose, few-seeded. Seeds oblong, with no aril. — Glabrous perennial, with thick horizontal rootstocks, sending up each year either a huge centrally peltate and cut-lobed rounded umbrella-like radical leaf, on a stout stalk, or a flowering stem bearing two similar (but smaller and more 2-cleft) alternate leaves which are peltate near one margin, and terminated by a cyme of white flowers. (Name from δίς, *double*, and φύλλον, *leaf.*)

1. **D. cymòsa** Michx. Root-leaves 3–6 dm. in diameter, 2-cleft, each division 5–7-lobed; lobes toothed; berries blue. — Wet or springy places, mts. of Va. and southw. May.

4. CAULOPHÝLLUM Michx. Blue Cohosh

Sepals 6, with 3 or 4 small bractlets at the base, ovate-oblong. Petals 6 thick gland-like somewhat kidney-shaped or hooded bodies, with short claws, much smaller than the sepals, one at the base of each of them. Stamens 6. Pistil gibbous; style short; stigma minute and unilateral; ovary bursting soon after flowering by the pressure of the 2 erect enlarging seeds, and withering away; the spherical seeds naked on their thick seed-stalks, looking like drupes, the fleshy integument turning blue; albumen horny. — A perennial glabrous herb, with matted knotty rootstocks, sending up in early spring a simple and naked stem, terminated by a small raceme or panicle of yellowish green flowers, and a little below bearing a large triternately compound sessile leaf (whence the name, from καυλός, *stem*, and φύλλον, *leaf*, the stem seeming to form a stalk for the great leaf.)

1. **C. thalictroìdes** (L.) Michx. (Pappoose Root.) Stems 3–7.5 dm. high; leaflets obovate-wedge-form, 2–3-lobed, a smaller biternate leaf often at the base of the panicle; flowers appearing while the leaf is yet small. — Deep rich woods, N. B. to Man., and southw. Apr., May. — Whole plant glaucous when young, as also the seeds, which are as large as peas.

5. BÉRBERIS [Tourn.] L. Barberry

Sepals 6, roundish, with 2–6 bractlets outside. Petals 6, obovate, concave, with two glandular spots inside above the short claw. Stamens 6. Stigma circular, depressed. Fruit a 1–few-seeded berry. Seeds erect, with a crustaceous integument. — Shrubs, with yellow wood and inner bark, yellow flowers in drooping racemes, sour berries, and 1–9-foliolate leaves. Stamens irritable. (Derived from *Berbêrys*, the Arabic name of the fruit.)

1. **B. canadénsis** Mill. (American B.) Leaves repandly toothed, the teeth less bristly-pointed; *racemes few-flowered;* petals notched at the apex; *berries ovoid;* otherwise as in the next. — Alleghenies of Va., southw. and westw.; *not* in Canada. June. — Shrub 3–9 dm. high.

2. **B. vulgàris** L. (Common B.) Leaves scattered on the fresh shoots of the season, mostly reduced to sharp triple or branched spines, from the axils of which the next season proceed rosettes or fascicles of obovate-oblong closely bristle-toothed leaves (the short petiole jointed !), and drooping *many-flowered racemes;* petals entire; *berries ellipsoid*, scarlet. — Thickets and waste grounds in e. and s. N. E., where it has become thoroughly wild; elsewhere occasionally spontaneous. May, June. (Nat. from Eu.)

LAURÀCEAE (Laurel Family)

Aromatic trees or shrubs, with alternate simple leaves mostly marked with minute pellucid dots, and flowers with a regular calyx of 4 *or* 6 *colored sepals, imbricated in* 2 *rows in the bud, free from the* 1-*celled and* 1-*ovuled ovary, and mostly fewer than the stamens; anthers opening by* 2 *or* 4 *uplifted valves.* — Flowers clustered. Style single. Fruit a 1-seeded berry or drupe. Seed anatropous, suspended, with no albumen, filled by the large almond-like embryo.

* Flowers perfect, panicled; stamens 12, three of them sterile, three with extrorse anthers.

1. **Persea.** Calyx persistent. Anthers 4-celled. Evergreen.

** Flowers dioecious, or nearly so; stamens in the sterile flowers 9; leaves deciduous.

2. **Sassafras.** Flowers in corymb- or umbel-like racemes. Anthers 4-celled, 4-valved.
3. **Litsea.** Flowers few in involucrate umbels. Anthers 4-celled, 4-valved.
4. **Benzoin.** Flowers in umbel-like clusters. Anthers 2-celled, 2-valved.

1. PÉRSEA [Plum.] Gaertn. f.

Flowers perfect, with a 6-parted calyx, persistent at the base of the berry-like fruit. Stamens 12, in four rows, the 3 of the innermost row sterile and gland-like, the rest bearing 4-celled anthers (*i.e.* with each proper cell divided transversely into two), opening by as many uplifted valves; the anthers of 3 stamens turned outward, the others introse. — Trees, with persistent entire leaves, and small panicled flowers. (An ancient name of some oriental tree.)

1. **P. Borbònia** (L.) Spreng. (Red Bay.) Tree of medium size; branchlets early glabrate; leaves oblong, soon shining above, pale and at length glabrate beneath; common *peduncle about equaling the petiole;* berry dark blue, on a red stalk. (*P. carolinensis* Nees.) — Swamps, s. Del. to Fla. and Tex.

2. **P. pubéscens** (Pursh) Sarg. Small tree; branchlets velvety; lower surface of lance-oblong leaves retaining more or less pubescence; *peduncles considerably longer than the petioles.* — Swamps, Fla. to N. C.; and reported from s. Va.

2. SÁSSAFRAS Nees

Flowers dioecious, with a 6-parted spreading calyx; the sterile kind with 9 stamens inserted on the base of the calyx in 3 rows, the 3 inner with a pair of stalked glands at the base of each; anthers 4-celled, 4-valved; fertile flowers

with 6 short rudiments of stamens and an ovoid ovary. Drupe ovoid (blue), supported on a club-shaped and rather fleshy reddish pedicel. — Trees, with spicy-aromatic bark, and very mucilaginous twigs and foliage; leaves deciduous, often lobed. Flowers greenish yellow, naked, in clustered and peduncled corymbed racemes, appearing with the leaves, involucrate with scaly bracts. (The popular name, applied by the early French settlers in Florida.)

1. **S. variifòlium** (Salisb.) Ktze. Trees 4–38 m. high, with yellowish green twigs; leaves ovate, entire, or some of them 3-lobed, soon glabrous. (*S. officinale* Nees & Eberm.; *S. Sassafras* Karst.) — Rich woods, s. Me. (*Deane, Parlin*) to s. Ont., Mich., e. Ia., and Kan., and s. to the Gulf. Apr.

3. LÍTSEA Lam.

Flowers dioecious, with a 6-parted deciduous calyx; the sterile with 9 stamens in 3 rows; their anthers all introrse, 4-celled, 4-valved; fertile flowers with 12 or more rudiments of stamens and a globular ovary. Drupe globular. — Shrubs or trees, with entire leaves, and small flowers in axillary clustered umbels. (Name of Chinese origin.)

1. **L. geniculàta** (Walt.) Nicholson. (Pond Spice.) Flowers (yellow) appearing before the deciduous oblong leaves, which are hairy on the midrib beneath; branches forked and divaricate, the branchlets zigzag; involucres 2–4-leaved, 2–4-flowered; fruit red. (*Malapoenna* Coult.) — Swamps, Va. to Fla. Apr.

4. BENZÒIN Fabric. Wild Allspice. Fever Bush

Flowers polygamous-dioecious, with a 6-parted open calyx; the sterile with 9 stamens in 3 rows, the inner filaments 1–2-lobed and gland-bearing at base; anthers 2-celled and 2-valved; fertile flowers with 15–18 rudiments of stamens in 2 forms, and a globular ovary. Drupe obovoid, red, the stalk not thickened. — Deciduous-leaved shrubs, with honey-yellow flowers in almost sessile lateral umbel-like clusters, appearing before the leaves (in our species); the clusters composed of smaller clusters or umbels, each of 4–6 flowers and surrounded by an involucre of 4 deciduous scales. Leaf-buds scaly. (So named from its odor, which resembles that of *benzoin*, an oriental gum.)

1. **B. aestivàle** (L.) Nees. (Spice Bush, Benjamin Bush.) *Nearly smooth* (2–5 m. high); *leaves oblong-obovate*, pale underneath. (*Lindera Benzoin* Blume; *B. Benzoin* Coult.) — Damp woods, s. Me. to Ont., Mich., e. Kan., and southw. March, Apr.

2. **B. melissaefòlium** (Walt.) Nees. Young branches and buds *pubescent; leaves oblong, obtuse or heart-shaped* at base, downy beneath; umbels few. (*Lindera* Blume.) — Low grounds, N. C. to Fla., w. to s. Ill. and Mo. Apr.

PAPAVERÀCEAE (Poppy Family)

Herbs with milky or colored juice, regular flowers with the parts in twos or fours, fugacious sepals, polyandrous, hypogynous, the ovary 1-celled with two or more parietal placentae. — Sepals 2, rarely 3, falling when the flower expands. Petals 4–12, spreading, imbricated and often crumpled in the bud, early deciduous. Stamens rarely as few as 16, distinct. Fruit a dry 1-celled pod (in *Papaver* imperfectly many-celled, in *Glaucium* 2-celled). Seeds numerous, anatropous, often crested, with a minute embryo at the base of fleshy and oily albumen. — Leaves alternate, without stipules. Peduncles mostly 1-flowered. Juice narcotic or acrid.

* Petals 8–12, not crumpled in the bud; pod 1-celled, 2-valved.

1. **Sanguinaria.** Petals white. Leaves and 1-flowered scape from a short rootstock.

* * Petals 4, crumpled in the bud; pod with 2 or more valves.

+ Pod 2–4-valved, the valves separating to the base from the placentae; leaves pinnately parted: flowers yellow.

2. **Stylophorum.** Pod bristly; style distinct; stigmas and placentae 3–4.
3. **Chelidonium.** Pod linear, smooth; style almost none; stigmas and placentae 2.
4. **Glaucium.** Pod rough, long-linear, 2-celled by a spongy partition; style none.

+ + Pod 4–20-valved, dehiscent only at the top or to the middle.

5. **Papaver.** Ovary incompletely many-celled; stigmas united into a radiate sessile crown.
6. **Argemone.** Stigmas (sessile) and placentae 4–6. Pod and leaves prickly.

1. SANGUINÀRIA [Dill.] L. Bloodroot

Sepals 2. Petals 8–12, spatulate-oblong. Stamens about 24. Style short; stigma 2-grooved. Pod ellipsoid or fusiform, turgid, 1-celled, 2-valved. Seeds with a large crest. — Low perennial; its thick prostrate rootstocks (surcharged with red-orange acrid juice) sending up in earliest spring a palmate-lobed leaf and 1-flowered scape. Flower white, handsome, the bud erect, the petals not crumpled. (Name from the color of the juice.)

1. **S. canadénsis** L. — Open rich woods; common. Apr., May.

Boccònia cordàta Willd., the Plume Poppy, a stout plant with glaucous cordate lobed leaves, and panicles of small greenish apetalous flowers, is frequent in cultivation and has been found as an escape in Madison Co., O. (*Mrs. Sharp*). (Introd. from China.)

2. STYLÓPHORUM Nutt. Celandine Poppy

Sepals 2, hairy. Petals 4. Style distinct, columnar; stigma 2–4-lobed. Pods bristly, 2–4-valved to the base. Seeds conspicuously crested. — Perennial low herbs, with stems naked below and oppositely 2-leaved, or sometimes 1–3-leaved, and umbellately 1–few-flowered at the summit; the flower-buds and the pods nodding. Leaves pinnately parted or divided. Juice yellow. (From στῦλος, *style*, and φέρειν, *to bear*, one of the distinctive characters.)

1. **S. diphýllum** (Michx.) Nutt. Leaves pale beneath, smoothish, deeply pinnatifid into 5 or 7 oblong sinuate-lobed divisions, and the root-leaves often with a pair of small distinct leaflets; peduncles equaling the petioles; flower deep yellow (5 cm. broad); stigmas 3 or 4; pod ovoid. — Damp woods, w. Pa. to Wisc., "Mo.," and Tenn. May. — Foliage and flower resembling Celandine.

3. CHELIDÒNIUM [Tourn.] L. Celandine

Sepals 2. Petals 4. Stamens 16–24. Style almost none; stigma 2-lobed Pod linear-cylindric, smooth, 2-valved, the valves opening from the bottom upward. Seeds crested. — Biennial herb with brittle stems, saffron-colored acrid juice, pinnately divided or 2-pinnatifid and toothed or cut leaves, and small yellow flowers in a pedunculate umbel; buds nodding. (Ancient Greek name, from χελιδών, the *swallow*, because its flowers appear with the swallows.)

1. **C. majus** L. — Rich damp soil about towns, centr. Me. to Ont., and southw., common from s. Me. to Pa. May–Aug. (Nat. from Eu.)

4. GLAÚCIUM [Tourn.] Hill. Horn Poppy. Sea Poppy

Sepals 2. Petals 4. Style none; stigma 2-lobed or 2-horned. Pod very long and linear, completely 2-celled by a spongy false partition; seeds crestless. — Annuals or biennials, with saffron-colored juice, clasping leaves, and solitary yellow flowers. (The Greek name, γλαύκιον, from the glaucous foliage.)

1. G. FLÀVUM Crantz. Lower leaves pinnatifid; upper ones sinuate-lobed and toothed, cordate-clasping; pods rough, 1.5–2.5 dm. long. (*G. luteum* Scop.; *G. Glaucium* Karst.) — Waste places, s. e. N. E., Md., and Va.; also about Syracuse, N. Y.; not common. (Adv. from Eu.)

5. PAPÀVER [Tourn.] L. Poppy

Sepals mostly 2. Petals mostly 4. Stigmas united in a flat 4–20-rayed crown, resting on the summit of the ovary and capsule; the latter short and turgid, with 4–20 many-seeded placentae projecting like imperfect partitions, opening by as many pores or chinks under the edge of the stigma. — Herbs with a white juice; the flower-buds nodding. (Derivation obscure.) — Four annual species of the Old World are sparingly adventive; *viz.:*

1. P. SOMNÍFERUM L. (COMMON P.) *Smooth*, glaucous; leaves clasping, wavy, incised and toothed; *pod globose;* corolla mostly white or purple. — Near dwellings in some places. (Introd. from Eu.)

2. P. RHOËAS L. (CORN P.) *Bristly;* leaves pinnatifid; *pods obovoid*, turbinate; corolla bright scarlet, often dark at center. — Rubbish heaps and rarely fields. (Introd. from Eu.)

3. P. DŬBIUM L. Pinnatifid leaves and the long stalks *bristly; pods club-shaped, smooth;* corolla light scarlet. — Cultivated fields and waste grounds, R. I., and southw., rare. (Adv. from Eu.)

4. P. ARGEMÒNE L. Smaller, with finer-cut leaves and paler flowers than the last; *pods club-shaped and bristly.* — Waste grounds, near Philadelphia. (Adv. from Eu.)

6. ARGEMÒNE L. Prickly Poppy

Sepals 2 or 3, often prickly. Petals 4–6. Style almost none; stigmas 3–6, radiate. Pod ellipsoid, prickly, opening by 3–6 valves at the top. Seeds crested. — Annuals or biennials, with prickly bristles and yellow juice. Leaves sessile, sinuate-lobed, and with prickly teeth, often blotched with white. Flower-buds erect, short-peduncled. (Name from ἄργεμα, a disease of the eye, for which the juice of a plant so called by the Greeks was a supposed remedy.)

1. A. intermèdia Sweet. Stout, very glaucous; *peduncles leafy; corolla white*, 8–10 cm. in diameter. (*A. platyceras* Man. ed. 6, not Link & Otto.) — Meredosia, Ill. (*Seymour*) to Neb., southw. and westw.

2. A. MEXICÀNA L. (MEXICAN P.) Less glaucous; *flowers* smaller, 3–6 cm. broad, *yellow* or rarely cream-colored (Var. OCHROLEŬCA Lindl.). — Waste places and ballast, southw.; casual northw. (Adv. from Mex.)

A. ÁLBA Lestiboudois, a southern species with *white flowers on naked peduncles*, is said to occur in Mo.

FUMARIÀCEAE (Fumitory Family)

Delicate smooth herbs, with watery juice, compound dissected leaves, irregular flowers, with 4 somewhat united petals, 6 diadelphous stamens, and 2-merous pods and seeds like those of the Poppy Family. — Sepals 2, small and scale-like. Corolla flattened, closed; the 4 petals in two pairs; the outer with spreading tips, and one or both of them spurred or saccate at the base; inner pair narrower, and their callous-crested tips united over the stigma. Stamens in two sets of 3 each, placed opposite the larger petals, hypogynous; their filaments often united; middle anther of each set 2-celled, the lateral ones 1-celled. Pod 1-celled, either 1-seeded and indehiscent, or several-seeded with 2 parietal placentae and deciduous valves. — Leaves delicate, usually alternate, without stipules. Slightly bitter innocent plants.

* Corolla bigibbous or 2-spurred, the 2 outer petals alike; pod several-seeded.

1. **Adlumia.** Petals united into a spongy persistent subcordate corolla. Seeds crestless.
2. **Dicentra.** Corolla cordate or 2-spurred at base, less united. Seeds crested.

* * Corolla with but one petal spurred at base, deciduous.

3. **Corydalis.** Pod with few to many crested or ariled seeds.
4. **Fumaria.** Fruit a globular 1-seeded nutlet. Seed crestless.

1. ADLŪMIA Raf. Climbing Fumitory

Petals all permanently united into a cordate-ovate corolla, becoming spongy cellular and persistent, inclosing the small few-seeded pod. Seeds not crested. Stigma 2-crested. Filaments monadelphous below in a tube which is adherent to the corolla, diadelphous at the summit. — A climbing biennial, with thrice-pinnate leaves, cut-lobed delicate leaflets, and ample panicles of drooping white or purplish flowers. (Dedicated to *Major J. Adlum*, amateur botanist.)

1. **A. fungòsa** (Ait.) Greene. — Wet or recently burned woods; e. Que. to Ont., Wisc., and s. in the mts. to N. C. June-Oct. (*A. cirrhosa* Raf.) — Handsome delicate vine climbing by the slender young leaf-stalks over high bushes; often cultivated, and frequently escaping.

2. DICÉNTRA Bernh.

Petals slightly cohering into a heart-shaped or 2-spurred corolla, either deciduous or withering-persistent. Stigma 2-crested and sometimes 2-horned. Filaments slightly united into two sets. Pod 10–20-seeded. Seeds crested. — Low stemless perennials (as to our wild species) with ternately compound and dissected leaves, and racemose nodding flowers. Pedicels 2-bracted. (Name from *δίς*, *twice*, and *κέντρον*, *a spur*; — accidentally printed Diclytra in the first instance, which by an erroneous conjecture was changed afterwards into Dielytra.) Bikukulla Adans. Bicuculla Millsp.

* *Raceme simple, few-flowered.*

1. **D. Cucullària** (L.) Bernh. (Dutchman's Breeches.) Scape and slender-petioled leaves from a sort of *granulate bulb*; lobes of leaves linear; *corolla with 2 divergent spurs* longer than the pedicel; *crest of the inner petals minute.* (*Bicuculla* Millsp.) — Rich woods, N. S. to L. Huron and Minn., s. to N. C. and Mo. — A very delicate plant, sending up in early spring, from the cluster of grain-like tubers crowded together in the form of a scaly bulb, the finely cut leaves and the slender scape, bearing 4–10 pretty, but odd, white flowers tipped with cream-color.

2. **D. canadénsis** (Goldie) Walp. (Squirrel Corn.) Subterranean shoots bearing scattered *grain-like tubers* (resembling peas or grains of Indian corn, yellow); leaves as in no. 1; *corolla merely heart-shaped*, the spurs very short and rounded; *crest of the inner petals conspicuous, projecting.* (*Bicuculla* Millsp.) — Rich woods, N. S. to Ont. and Minn., s. to Va., Ky., and Mo. Apr., May. — Flowers greenish white tinged with rose, with the fragrance of hyacinths.

* * *Racemes compound, clustered.*

3. **D. exímia** (Ker) Torr. Subterranean shoots scaly; divisions and lobes of the leaves broadly oblong; corolla oblong, 2-saccate at the base; crest of the inner petals projecting. (*Bicuculla* Millsp.) — Rocks, w. N. Y., rare, and southw. along the Allegheny. May–Aug. — Coarser-leaved than the others; scapes 1.5–2.5 dm. high.

3. CORÝDALIS [Dill.] Medic.

Corolla 1-spurred at the base (on the upper side), deciduous. Style persistent. Pod many-seeded. Seeds crested or ariled. Flowers in racemes. Our species are biennial, leafy-stemmed, and pale or glaucous. (The ancient Greek name for the crested lark.) Capnoides Adans. Capnodes Ktze.

* *Stem strict; flowers purplish or rose-color with yellow tips.*

1. C. sempérvirens (L.) Pers. (PALE C.) Plant 1–6 dm. high.; racemes panicled; spur of the corolla very short and rounded; pods erect, slender, elongated. (*C. glauca* Pursh; *Capnoides* Borkh.) — Rocky places and recent clearings, e. Que. to Alaska, s. to Ga., Ky., Minn., and Mont. May–Aug.

* * *Low, ascending; flowers yellow.*

← *Outer petals wing-crested on the back.*

2. C. flávula (Raf.) DC. Pedicels slender, conspicuously bracted; corolla pale yellow, 6–8 mm. long, spur very short; tips of the outer petals pointed, longer than the inner; *crest 3–4-toothed;* pods torulose, pendulous or spreading; seeds acutely margined, rugose-reticulated; arils loose. (*Capnodes* Ktze.) — N. Y. to Minn., Kan. (according to Britton), and southw.

3. C. micrántha (Engelm.) Gray. Pedicels short and bracts small; corolla pale yellow, 8 mm. long, with short spur and *entire crest*, or flowers often cleistogamous and much smaller, without spur or crest; pods ascending, torulose; seeds obtuse-margined, smooth and shining. (*Capnoides* Britton.) — Va. to Minn., Kan. (*Shear, Hitchcock*), and southw.

4. C. crystállina Engelm. Pedicels short, erect; *corolla bright yellow, 1.7 cm. long*, the spur nearly as long as the body; crest very broad, usually toothed; *pods* terete, erect, densely *covered with transparent vesicles;* seeds acutely margined, tuberculate. (*Capnodes* Ktze.) — Prairies and fields, s. w. Mo., Kan. and Ark.

← ← *Outer petals merely carinate on the back, not crested.*

5. C. aúrea Willd. (GOLDEN C.) Corolla golden-yellow, 1.2 cm. long, the slightly decurved spur about half as long, shorter than the pedicel; pods spreading or pendulous, becoming torulose; seeds obtuse-margined. (*Capnodes* Ktze.) — Rocky (calcareous) banks and recent clearings, e. Que. to Mackenzie, s. to Vt., Pa., Wisc., and Mo.; also in the Rocky Mts. to Ariz.

Var. occidentàlis Engelm. Flowers rather larger, the spur nearly as long as the body; pods less torulose, on short pedicels; seeds acutish on the margin. (*Capnoides montanum* and ? *C. campestre* Britton.) — Rocky barrens and prairies, Mo., westw. and southw.

4. FUMÀRIA [Tourn.] L. FUMITORY

Corolla 1-spurred at the base. Style deciduous. Fruit indehiscent, small, globular, 1-seeded. Seeds crestless. — Branched and leafy-stemmed annuals, with finely dissected compound leaves, and small flowers in dense racemes or spikes. (Name from *fumus*, smoke, presumably from the nitrous odor of the roots when first pulled from the ground.)

F. OFFICINÀLIS L. (COMMON F.) Sepals ovate-lanceolate, acute, sharply toothed, narrower and shorter than the corolla (which is flesh-color tipped with crimson); fruit slightly notched. — Waste places, about dwellings. (Adv. from Eu.)

CRUCÍFERAE (MUSTARD FAMILY)

Herbs, with a pungent watery juice and cruciform tetradynamous regular flowers; fruit a silique or silicle. Sepals 4, deciduous. Petals 4, hypogynous, their spreading limbs forming a cross. Stamens 6, two of them inserted lower down and shorter (rarely only 4 or 2). Pod usually 2-celled by a thin partition stretched between the two marginal placentae, from which when ripe the valves separate, either much longer than broad (a *silique*), or short (a *silicle*), sometimes indehiscent and nut-like, or separating across into 1-seeded joints. Seeds campylotropous, without albumen, filled by the large embryo, which is curved or folded in various ways: *i.e.* the *cotyledons accumbent*, viz., their margins on

one side applied to the radicle, so that the cross-section of the seed appears thus ○=; or else *incumbent*, viz., the back of one cotyledon applied to the radicle, thus ○‖. In these cases the cotyledons are plane; but they may be folded upon themselves and round the radicle, as in *Brassica*, where they are *conduplicate*, thus ○>>. In *Leavenworthia* alone the whole embryo is straight. — Leaves (except in *Lunaria*) alternate; stipules none. Flowers in terminal racemes or corymbs; pedicels rarely bracted. A large and natural family, of pungent or acrid, but not poisonous plants. The pods and seeds give the chief characters of the genera.

Tribe I. ALÝSSEAE. Pubescence, at least in part, branched or stellate. Pods orbicular to (rarely) linear, short, dehiscent, flattened parallel to a broad partition. Cotyledons mostly accumbent.

* Fruit oval, short-oblong, lanceolate, or rarely linear; seeds wingless.

1. **Draba.** Petals entire, emarginate or (in § *Erophila*) bifid. Seeds numerous, in 2 rows in each cell. Pubescence stellate.

* * Fruit orbicular or broadly elliptical.

2. **Berteroa.** Petals bifid. Filaments toothed near the base. Pubescence stellate, not appressed. Capsule-valves flat. Seeds few, winged.
3. **Lobularia.** Petals entire. Filaments toothed near the base. Hairs 2-lobed, attached in the middle, appressed.
4. **Alyssum.** Petals entire or retuse. Pubescence stellate. Capsules orbicular; valves convex; cells (in our species) 2-seeded.

Tribe II. PHYSARÌEAE. Fruit short, very turgid, subglobose or didymous, dehiscent. Cotyledons accumbent. Pubescence stellate.

5. **Lesquerella.** Pod globose or nearly so.

Tribe III. LEPIDÌEAE. Fruit 2-celled, dehiscent, short, strongly obcompressed (except in the aquatic genus *Subularia*). Pubescence of simple hairs or none.

* Pod strongly obcompressed or didymous, with narrow partition; flowers white.

+ Seeds several; cotyledons accumbent.

6. **Thlaspi.** Pods orbicular, obovate or obcordate, winged.

+ + Seeds solitary in the cells.

7. **Lepidium.** Pods ovate or orbicular, flat, scale-shaped.
8. **Coronopus.** Pods didymous; valves rugose or tuberculate, separating at maturity from the little partition as 2 closed nutlets. Cotyledons incumbent, narrow.

* * Pod ovoid or globular.

9. **Subularia.** Dwarf, aquatic. Leaves awl-shaped. Flowers minute, white.

Tribe IV. CAMELÍNEAE. Fruit short, scarcely longer than broad. Cotyledons incumbent. Some or all of the hairs branched.

* Pod 2-valved, dehiscent.

10. **Capsella.** Pod (in ours) obcordate-triangular, wingless. Flowers white.
11. **Camelina.** Pod somewhat turgid, obovoid. Flowers yellow.

* * Pod indehiscent.

12. **Neslia.** Pod compressed-globose. Flowers yellow.

Tribe V. CAKÍLEAE. Fruit transversely 2-jointed; cells unequal, each 1-seeded, the ovule in the upper erect, in the lower pendulous. Cotyledons accumbent.

13. **Cakile.** Corolla white or purplish. Fleshy herbs.

Tribe VI. BRASSÍCEAE. Fruit elongated. Cotyledons conduplicate (folded about the radicle). Hairs simple or none.

* Fruit indehiscent, often moniliform, 1-celled or transversely several-celled, the partitions spongy or pithy.

14. **Raphanus.** Petals large, pale yellow or purplish. Fruit stout, beaked.

* * Fruit longitudinally 2-celled, dehiscent.

15. **Brassica.** Seeds globose, in a single row in each cell.
16. **Diplotaxis.** Seeds ovoid, in 2 rows in each cell.

Tribe VII. SISYMBRÌEAE. Stigma, when lobed, with lobes over the placentae. Fruit lance-oblong to linear, 2-celled, dehiscent. Cotyledons incumbent.

* Cauline hairs simple or stellate, not regularly bifid.

+ Petals small (not over 1 cm. long), yellow, white, or pale purple.

17. **Conringia.** Glabrous. Leaves elliptical, entire, cordate, sessile.
18. **Alliaria.** Glabrous or pubescent. Leaves orbicular or reniform, broadly cordate, toothed, petiolate.
19. **Sisymbrium.** Pubescent. Leaves various but not as in either of the two preceding. Partition of fruit 1-nerved or, if not nerved, of thin-walled elongated cells.
20. **Braya.** Pubescent. Leaves small, narrowly oblong or spatulate, toothed or subentire, sessile. Partition of the fruit without midnerve, its cells thick-walled.

+ + Petals large (1.5–2 cm. long), deep purple.

21. **Hesperis.** Tall. Leaves ovate-lanceolate, denticulate, the lower long-petioled. Pods very long and slender.

* * Cauline hairs 2-branched, the branches vertical and appressed.

22. **Erysimum.** Petals yellow or orange. Leaves lanceolate to linear, not clasping, entire or toothed.

Tribe VIII. ARABÍDEAE. Fruit 2-celled, dehiscent, globose to long and slender, terete or flattened parallel to a broad partition. Cotyledons accumbent (in *Leavenworthia* the embryo sometimes nearly straight).

* Fruit globose to ovoid or oblong and terete; petals yellow or white.

23. **Radicula.** Flowers small. Leaves toothed, lobed, or pinnate.

* * Fruit either terete and elongated or elliptic- or linear-oblong and strongly compressed parallel to a broad partition.

+ Petals yellow.

24. **Barbarea.** Pods slender, terete or nearly so. Biennials.
25. **Selenia.** Pods broadly elliptic-oblong, very flat. Low annual.

+ + Petals white, pink, or purple, not yellow except sometimes near the base.

++ Pods long and slender, not at all compressed parallel to the partition.

26. **Iodanthus.** Lateral sepals somewhat horned on the back near the apex. Petals broadly spatulate, purple.

++ ++ Pods elliptic-oblong or lance-elliptic, about 2.5 cm. broad, very flat.

27. **Lunaria.** Petals purple. Leaves deltoid-ovate.

++ ++ ++ Pods distinctly compressed parallel to the partition, but not over 1 cm. broad.

= Peduncles radical, 1-flowered.

28. **Leavenworthia.** Pods oblong, sometimes torulose. Flowers purple or white with a yellow eye.

= = Peduncles not radical, several-flowered.

29. **Dentaria.** Glabrous or pubescent with simple hairs. Rootstock fleshy, toothed, or moniliform-tuberous. Stem naked below, bearing near the middle 2–3 verticillate or alternate leaves; these for the most part palmately 3–7-foliolate, petiolate. Seeds wingless.
30. **Cardamine.** Glabrous or pubescent with simple hairs, fibrous-rooted, rarely tuber-bearing. Stem leafy; leaves alternate, from ovate and crenate-dentate to pinnate. Seeds wingless.
31. **Arabis.** Usually pubescent, some or all of the hairs being branched. Roots fibrous; no tubers. Seeds usually winged or wing-margined. Leaves alternate simple or pinnatifid.

Artificial Key to Genera

a. Petals present, with yellow blade and yellowish or whitish claw *b.*
- *b.* Fruit short, not more than 3 times as long as broad.
  - Pubescence stellate.
    - Pods thick.
      - Pods globose.
        - Pods dehiscent . . . . . 5. Lesquerella
        - Pods indehiscent . . . . . 12. Neslia.
      - Pods obovoid . . . . . 11. Camelina.
    - Pods thin.
      - Pods orbicular . . . . . 4. Alyssum.
      - Pods oblong . . . . . 1. Draba.
  - Pubescence simple or none.
    - Pods subglobose or cylindrical . . . . . 23. Radicula.
    - Pods very flat and thin . . . . . 25. Selenia.
- *b.* Fruit much more than 3 times as long as broad.
  - Pods 1-celled or with spongy cross partitions . . . . . 14. Raphanus.
  - Pods longitudinally 2-celled.
    - Seeds 2-rowed in each cell . . . . . 16. Diplotaxis.
    - Seeds 1-rowed in each cell.
      - Petals 7–15 mm. long.
        - Pods thickish, 2–6 mm. in diameter . . . . . 15. Brassica.
        - Pods linear, about 1 mm. in diameter . . . . . 19. Sisymbrium
      - Petals smaller.
        - Stem-hairs vertical, attached by the middle, appressed . . 22. Erysimum.
        - Stem-hairs (if present) otherwise.
          - Stem-leaves lanceolate, sessile, subentire; stem villous at base . . . . . 31. Arabis.
          - Stem-leaves elliptical, sessile, entire; stem glabrous . . 17. Conringia.
          - Stem-leaves petiolate, toothed or pinnate.
            - Leaves bipinnatifid . . . . . 19. Sisymbrium.
            - Leaves simple or pinnatifid.
              - Pods awl-shaped, tapering, closely appressed . . 19. Sisymbrium.
              - Pods linear, cylindrical or compressed.
                - Pods (when ripe) 2–5 cm. long . . . . . 24. Barbarea.
                - Pods (when ripe) 7–9 cm. long . . . . . 19. Sisymbrium.

a. Petals (when present) with blade white or purplish (sometimes yellow at the base) *c.*
- *c.* Peduncles 1-flowered, radical . . . . . 28. Leavenworthia
- *c.* Peduncles several-flowered, not radical *d.*
  - *d.* Dwarf aquatic with awl-shaped entire leaves . . . . . 9. Subularia.
  - *d.* Otherwise *e.*
    - *e.* Fruit transversely 2-celled; plant fleshy . . . . . 13. Cakile.
    - *e.* Fruit longitudinally 2-celled *f.*
      - *f.* Pods short, rarely 3 times as long as wide *g.*
        - *g.* Pods compressed contrary to a narrow partition.
          - Carpels thickish, tuberculate-crested or deeply wrinkled . 8. Coronopus.
          - Carpels compressed, smoothish.
            - Pods wedge-shaped at the base; some or all of the hairs branched . . . . . 10. Capsella.
            - Pods not wedge-shaped at the base; hairs simple or none.
              - Seeds several in each cell . . . . . 6. Thlaspi.
              - Seeds solitary in each cell . . . . . 7. Lepidium.
        - *g.* Pods compressed (if at all) parallel to the broadish partition.
          - Pods 2–3 cm. broad . . . . . 27. Lunaria.
          - Pods narrower.
            - Hairs none or all simple . . . . . 23. Radicula.
            - Hairs at least in part branched or attached by the middle.
              - Hairs vertically 2-forked, appressed, apparently attached by the middle . . . . . 3. Lobularia.
              - Hairs otherwise.
                - Seeds 2 in each cell; pods orbicular . . . . . 4. Alyssum.
                - Seeds several to many in each cell.
                - Petals deeply bifid.
                - Scapose, 1 dm. or less high . . . . . 1. Draba.
                - Leafy-stemmed, 3–8 dm. high . . . . . 2. Berteroa.
                - Petals nearly or quite entire . . . . . 1. Draba.
      - *f.* Pods 4–∞ times as long as wide *h.*
        - *h.* Hairs simple or none.
          - Leaves palmately divided . . . . . 29. Dentaria.
          - Leaves otherwise.
            - Fruit thickish, 4–7 mm. in diameter . . . . . 14. Raphanus.
            - Fruit slender, 1–3 mm. in diameter.
              - Petals purple or rose-colored.
                - Lateral sepals with a hump (often tufted) just below the summit . . . . . 26. Iodanthus.
                - Lateral sepals unappendaged . . . . . 30. Cardamine

Petals white.
Valves of pod conspicuously keeled . . . . . 18. ALLIARIA.
Valves of pod rounded or flat.
Pods terete . . . . . 23. RADICULA.
Pods more or less flattened . . . . . 30. CARDAMINE.
h. Hairs at least in part branched.
Stigma obtusely cone-shaped; petals purple, 15–20 mm. long . . . 21. HESPERIS.
Stigma otherwise; petals smaller.
Pods terete or 4-angled, sometimes torulose.
Tall, 6–12 dm. high; pods 8 cm. long . . . . . 31. ABARIS.
Not over 3 dm. high; pods shorter.
Annual; pods not torulose . . . . . 19. SISYMBRIUM.
Perennial; pods more or less torulose . . . . . 20. BRAYA.
Pods decidedly flattened.
Pods lanceolate to narrowly oblong, rarely over 13 mm. in length . 1. DRABA.
Pods linear, when normal and mature 15–80 mm. long . . . 31. ABARIS.

1. DRÀBA [Dill.] L.

Pod oval, oblong, or even linear, flat; the valves plane or slightly convex; the partition broad. Seeds several or numerous, in 2 rows in each cell, marginless. Cotyledons accumbent. Filaments not toothed. — Low herbs with entire or toothed leaves, and white or yellow flowers; pubescence often stellate. (Name from δράβη, applied by Dioscorides to some cress; meaning unknown.)

731. D. verna. Part of fruiting raceme × 2/3. Petal × 1 1/3.

§ 1. ERÓPHILA (DC.) Reichenb. *Annual or biennial; flowers white, cleistogamous; petals 2-cleft.*

1. D. VÉRNA L. (WHITLOW GRASS.) Small (scapes 2.5–8 cm. high); leaves all radical, oblong or lanceolate; racemes elongated in fruit; pods varying from round-oval to oblong-lanceolate, smooth, shorter than the pedicels. — Sandy waste places and roadsides, e. Mass. to Minn. and southw. — A species remarkable as an aggregate of many closely related forms which, from their cleistogamy, seldom cross or intergrade. Apr., May. (Nat. from Eu.) FIG. 731.

§ 2. DRABÉLLA DC. *Winter annuals; leafy stems short; leaves oblong or obovate, hairy, sessile; petals entire or merely emarginate, white (yellow in no. 4); style none.*

2. D. caroliniàna Walt. Small (2.5–12 cm. high); peduncles scape-like; petals usually twice the length of the calyx; *raceme short or corymbose in fruit* (1.2–2.5 cm. long); *pods broadly linear, smooth*, much longer than the ascending pedicels. — Sandy and waste fields, e. Mass. to Minn., Neb., and southw. March–May. FIG. 732. — Petals often wanting in the later racemes, especially in the var. MICRÁNTHA (Nutt.) Gray, with minutely rough-hairy pods, which is found with the other, westw.

732. D. caroliniana. Fruiting raceme × 2/3. Fruit with valves removed × 1 1/3.

3. D. cuneifòlia Nutt. Leaves obovate, wedge-shaped, or the lowest spatulate, toothed; *raceme somewhat elongated in fruit* (2.5–7.5 cm.), at length equaling the naked peduncle; petals emarginate, much longer than the calyx; *pods oblong-linear, minutely hairy, longer than the spreading pedicels.* — Grassy places. Ky., Ill.? to e. Kan., southw., and southwestw. March, Apr. FIG. 733.

734. D. brachycarpa. Inflorescence × 2/3.

4. D. brachycàrpa Nutt. Low (5–10 cm. high), minutely pubescent; *stems leafy* to the base of the dense at length elongated raceme; leaves (4–8 mm. long) narrowly oblong or the lowest ovate, few-

733. D. cuneifolia. Fruiting raceme × 2/3

735. D. nemorosa. Part of fruiting raceme × 2/3.

toothed or entire; flowers small; *pods smooth, narrowly oblong, acutish* (4 mm. long), about the length of the *ascending or spreading pedicels.* — Open ground, Va. to Kan., and southw. Apr. Fig. 734. — Petals sometimes minute, sometimes none.

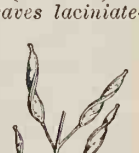
5. **D. nemoròsa** L. Leaves oblong or somewhat lanceolate, more or less toothed; *racemes elongated* (1–2 dm. long in fruit); petals emarginate, small; *pods elliptical-oblong, half the length of the horizontal or widely spreading pedicels*, pubescent or smooth. — Fort Gratiot, Mich., n. Minn., northw. and westw. (Eu.) Fig. 735.

§ 3. DRABAÈA Lindblom. *Petals not notched or cleft; perennial or biennial, leafy-stemmed, leaves finely stellate-pubescent; flowers white; style definite.*

Pods pubescent.	
Style less than 1 mm. long	6. *D. stylaris.*
Style 2–4 mm. long	7. *D. ramosissima.*
Pods glabrous	8. *D. arabisans.*

6. **D. stylàris** J. Gay. Caudex simple or branching; *flowering stems simple or slightly branched*, pilose, 0.5–3.5 dm. high, remotely leafy; basal rosettes with *oblanceolate entire or remotely dentate canescent leaves* (1–4 cm. long), the cauline leaves ovate to oblong, usually dentate; racemes loose; *pedicels short, ascending;* pods narrowly oblong to lanceolate, sometimes twisted, 7–12 mm. long. (*D. incana* Man. ed. 6, not L.) — Dry calcareous cliffs and ledges, locally from Lab. to N. B. and n. Vt.; Rocky Mts. May, June. (Eurasia.)

7. **D. ramosíssima** Desv. *Darker green*, less pubescent; *leaves laciniate-toothed; racemes corymbosely-branched; pedicels elongate, spreading;* pods oval-oblong or lanceolate, strongly twisted, 4–10 mm. long. — Cliffs, Va. to Ky., and southw. Apr.–June.



736. D. arabisans. Part of fruiting raceme × 2/3.

8. **D. arábisans** Michx. Caudex usually much-branched, the flowering stems simple or slightly branched, 1.5–4.5 dm. high, *sparingly pubescent; basal leaves* oblanceolate or spatulate, entire or somewhat dentate, *thin, green*, sparingly stellate, 1–7 cm. long, cauline scattered, serrate-dentate; racemes loose; pedicels divergent; *pods elliptic-lanceolate, much twisted*, 9–15 mm. long; style about 1 mm. long. (*D. incana*, var. *arabisans* Wats.) — Rocky (usually calcareous) banks, Nfd. to Ont., locally s. to Me., Vt., and n. and w. N. Y. May–July. Fig. 736.

Var. **orthocárpa** Fernald & Knowlton. Low (1–3 dm. high); *pods flat*, 5–10 mm. long. — Lab. to N. B. and n. Vt.

Var. **canadénsis** (Brunet) Fernald & Knowlton. Low (1–1.5 dm. high); *pods elliptic-ovate to suborbicular*, 5–7 mm. long. — St. Joachim, Que.

2. BERTERÒA DC.

737. B. incana. Petal × 2. Pod × 2.

Pod elliptic; seeds several, winged. Petals white, 2-parted. Pubescence stellate. (*Carlo Guiseppe Bertero*, Piedmontese botanist.)

1. **B. incàna** (L.) DC. Pale green, 3–6 dm. high, branched; leaves entire, lanceolate; *pods canescent-pubescent, plump*, 2.5–3.5 *mm. thick.* (*Alyssum* L.) — Recently introduced (with clover seed?), becoming common in N. E.; occasional in other Atlantic States, and extending inland. (Nat. from Eu.) Fig. 737.

2. **B. mutábilis** (Vent.) DC. Similar; *pods sparingly pubescent or glabrate, flattish*, 4.5–6 *mm. broad.* — Roadsides and cultivated ground, Mass.; less frequent than the preceding. (Adv. from Eu.)

3. LOBULÀRIA Desv. Sweet Alyssum

Pod as in *Alyssum*. Petals white, entire. Cotyledons accumbent. Hairs of the stem and leaves 2-pointed, appressed, attached in the middle. (Latin *lobulus*, a little lobe, probably referring to the 2-lobed hairs.)

1. L. maritima (L.) Desv. Slightly hoary; leaves linear; flowers small, honey-scented. (*Alyssum* Lam.; *Koniga* R. Br.) — Often cultivated, and occasionally spontaneous. (Introd. from Eu.)

4. ALÝSSUM [Tourn.] L.

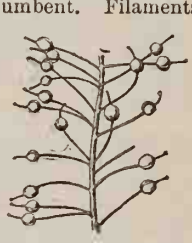
Pod small, orbicular, with only one or two wingless seeds in a cell; valves nerveless, somewhat convex, the margin flattened. Flowers yellow or white. Cotyledons accumbent. Plant stellate-pubescent. (Greek name of a plant reputed to check hydrophobia, as the etymology denotes.)

738. A. alyssoides. Pod with persistent calyx × 2/3.

1. A. alyssoìdes L. Dwarf hoary annual, with linear-spatulate leaves, pale yellow or whitish petals little exceeding the persistent calyx, and orbicular sharp-margined 4-seeded pod, the style minute. (*A. calycinum* L.) — Occasional in grass-land. (Adv. from Eu.) Fig. 738.

5. LESQUERÉLLA Wats.

Pod mostly globular or inflated, with a broad orbicular to ovate hyaline partition nerved to the middle, the hemispherical or convex thin valves nerveless. Seeds few or several, in 2 rows, flat. Cotyledons accumbent. Filaments toothless. — Low herbs, hoary with stellate hairs or lepidote. Flowers mostly yellow. (Named for *Leo Lesquereux*, distinguished bryologist and paleobotanist, 1805–1889.)



739. L. globosa. Part of fruiting raceme × 2/3.

1. L. globòsa (Desv.) Wats. *Minutely hoary all over;* stems spreading or decumbent from an annual or biennial root; *leaves oblong or lanceolate*, with a tapering base, *repand-toothed* or nearly entire; raceme at length elongated, with filiform diverging pedicels; petals light yellow; style filiform, much longer than the small globose acutish about 4-seeded pod; seeds marginless. (*Vesicaria Shortii* Torr.) — Rocky banks, Ky. and Tenn. May, June. Fig. 739.

740. L. gracilis. Part of fruiting raceme × 2/3.

2. L. argéntea (Pursh) MacM. Biennial or perennial; pubescence compact; *leaves linear-oblanceolate, mostly entire; pods pubescent, pendulous* on recurved pedicels; style long. (*L. ludoviciana* Wats.) — Minn. to Neb. and southwestw.

3. L. grácilis (Hook.) Wats. Annual, slender; pubescence very fine; leaves narrowly oblanceolate; *pods glabrous, suberect* on ascending or curved pedicels, stipitate; style long. (*Vesicaria* Hook.) — Mo. and Kan. to Tex. Fig. 740.

6. THLÁSPI [Tourn.] L. Penny Cress

Pod orbicular, obovate, or obcordate, flattened contrary to the narrow partition, the midrib or keel of the boat-shaped valves extended into a wing. Seeds 2–8 in each cell. Cotyledons accumbent. Petals equal. — Low plants, with root-leaves undivided, stem-leaves arrow-shaped and clasping, and small white or purplish flowers. (Name from θλάειν, *to crush*, from the flattened pod.)

741. T. arvense. Pod × 2/3.

1. T. arvénse L. (Field P. or Mithridate Mustard.) Smooth annual; *lower leaves wing-petioled, the upper sagit-*

tate-clasping; broadly winged pod 1.2 cm. in diameter, deeply notched at top; style minute. — Waste places; not common, except along our northern borders, where too abundant and called "FRENCHWEED." (Nat. from Eu.) FIG. 741.

2. T. PERFOLIÀTUM L. *Leaves sessile, the upper subperfoliate;* pod smaller (5 mm. broad). — Reported as occurring near Hamilton, Ont. (Adv from Eu.)

7. LEPÍDIUM [Tourn.] L. PEPPERWORT. PEPPERGRASS

Pod roundish, much flattened contrary to the narrow partition; valves boat-shaped. Seeds solitary in each cell, pendulous. Cotyledons incumbent, or in no. 1 accumbent! Flowers small, white or greenish. (Name from λεπίδιον, *a little scale*, alluding to the fruit.) — Ours are annuals or biennials, except the last.

* *Leaves all with a tapering base, the upper linear or lanceolate and entire, the lower and often the middle ones incised or pinnatifid.*

← *Stamens* 2; *pods orbicular or oval, slightly notched at top; style minute or none; fruiting pedicels slender, widely spreading; plant green.*

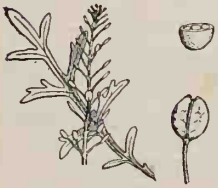
1. L. virginicum L. (WILD PEPPERGRASS.) *Cotyledons accumbent* and seed minutely margined; *pod marginless* or obscurely margined at the top; petals present, except in some of the later flowers. — A common weed of roadsides and waste places. June–Sept. FIG. 742.

742. L. virginicum.
a. Leaves and tip of raceme × 2/3.
b. Septum, pod, and petal × 2⅓.
c. Cross-section of seed × 4.

2. L. APÉTALUM Willd. *Nearly scentless;* leaves toothed or pinnatifid; *cotyledons incumbent* as in the following; *pod orbicular, minutely wing-margined at the top;* petals usually wanting. (*L. intermedium* Man. ed. 6.) — Dry places, especially roadsides, by railroads, etc., perhaps native in the West, recently introd. eastw. (Eurasia.) FIG. 743.

743. L. apetalum.
Leaf and tip of raceme × 2/3.
Pod × 2⅓.
Cross-section of seed × 4.

3. L. RUDERÀLE L. *Very fetid;* lower leaves bipinnatifid; the smaller and *oval pods and seeds marginless;* petals none. — Roadsides and waste places, chiefly near Atlantic ports. (Nat. from Eu.) FIG. 744.



744. L. ruderale.
Leaf and tip of raceme × 2/3.
Pod × 2⅓.
Cross-section of seed × 4.

← ← *Stamens* 6; *pods ovate, winged; style more evident in deeper notch; pedicels thickish, compressed, ascending; plant very glaucous.*

4. L. SATÌVUM L. (GARDEN CRESS.) Glabrous annual (3 dm. high); lower leaves bipinnatifid; racemes long and stiff; petals present. — Common salad plant, tending to escape from cultivation. (Introd. from Eu.) FIG. 745.

745. L. sativum
Part of fruiting raceme × 2/3.

** * Stem-leaves with a sagittate partly clasping base, rather crowded.*

746. L. campestre. Part of fruiting raceme × 2/3.

5. L. CAMPÉSTRE (L.) R. Br. Minutely *soft downy;* leaves arrow-shaped, somewhat toothed; *pods ovate, winged,* rough, the style longer than the narrow notch. — Fields, roadsides, etc., becoming common. (Nat. from Eu.) FIG. 746.

747. L. Draba. Part of fruiting raceme × 2/3.

6. L. DRÀBA L. Perennial, *obscurely hoary;* leaves oval or oblong, the upper with broad clasping auricles; flowers corymbose; *pods heart-shaped, wingless,* thickish, entire, tipped with a conspicuous style. — Waste places and cultivated grounds; not common. (Nat. from Eu.) FIG. 747.

748. C. didymus. Leaf and pod × 2 2/3.

8. CORÓNOPUS Ludwig. WART CRESS. SWINE CRESS

Pod flattened contrary to the narrow partition; the two cells indehiscent, strongly wrinkled or tuberculate, 1-seeded. Cotyledons narrow and incumbently folded transversely. — Diffuse or prostrate fetid annuals or biennials, with minute whitish flowers. Stamens often only 2. (Name from κορώνη, *crow,* and πούς, *foot,* from the deeply cleft leaves.) SENEBIERA Poir.

1. C. DÍDYMUS (L.) Sm. Leaves 1–2-pinnately parted, *pods notched at the apex,* rough-wrinkled. (*Senebiera* Pers.) — Waste places, chiefly near ports. (Adv. from the Old World and now widely distributed as a cosmopolitan weed.) FIG. 748.

749. C. procumb. Pod × 2 2/3.

2. C. PROCÚMBENS Gilibert. Leaves less divided, with narrower lobes; *pods not notched at the apex, tubercled.* (*C. Coronopus* Karst.; *Senebiera Coronopus* Poir.) — Ballast, infrequent, much rarer than the preceding species. (Adv. from Eu.) FIG. 749.

9. SUBULÀRIA L. AWLWORT

Pod ovoid or globular, with a broad partition; the turgid valves 1-nerved. Seeds several. Cotyledons long and narrow, incumbently folded transversely, *i.e.,* the cleft extending to the radicular side of the curvature. Style none. — A dwarf stemless perennial, aquatic; the tufted leaves awl-shaped (whence the name). Scape naked, few-flowered, 2–8 cm. high. Flowers minute, white.

1. S. aquática L. The only species. — Margins of lakes and slow streams, Nfd. to B. C., southw. to centr. N. E., Wyo., and Cal.; local. Aug., Sept. (Eu., Siber.)

10. CAPSÉLLA Medic. SHEPHERD'S PURSE

Pod obcordate-triangular, flattened contrary to the narrow partition; the valves boat-shaped, wingless. Seeds numerous. Cotyledons incumbent. — Annuals; petals small, white. (Name a diminutive of *capsa,* a box.)

1. C. BÚRSA-PASTÒRIS (L.) Medic. Stem-leaves arrow-shaped, sessile. (*Bursa* Britton.) — Common weed; Apr.–Sept. (Nat. from Eu.) — Extremely variable in foliage and outline of pod. Upon these characters Almquist has proposed sixty-three forms or elementary species.

11. CAMÉLINA Crantz. FALSE FLAX

Pod obovoid or pear-shaped, pointed, margined; partition broad; valves 1-nerved. Seeds numerous, oblong. Cotyledons incumbent. Style slender. Flowers small, yellow. (Name from χαμαί, *dwarf,* and λίνον, *flax.*)

750. C. sativa. Part of fruiting raceme × ⅓.

1. **C.** SATÌVA (L.) Crantz. Annual; leaves lanceolate and arrow-shaped; *pods large* (6–7 *mm. broad*), on pedicels 1.2–3 cm. long. — A weed in newly planted fields, etc. (Nat. from Eu.) FIG. 750.

2. **C.** MICROCÁRPA Andrz. More slender; racemes long; pedicels 8–18 mm. in length; *pods smaller*, 4–5 *mm. broad*. (*C. silvestris* Wallr.) — Roadsides, newly seeded fields, etc. (Nat. from Eu.) FIG. 751.

751. C. microcarpa. Part of fruiting raceme × ⅓.

12. NÉSLIA Desv. BALL MUSTARD

Pod subglobose, compressed, beaked, indehiscent, 1-celled or obscurely 2-celled, the surface reticulated. Seed 1 (rarely 2). Cotyledons incumbent. Style slender. Flowers small, yellow. (Named for *J. A. N. de Nesle* of Poitiers.)

1. **N.** PANICULÀTA (L.) Desv. Slender annual or biennial, somewhat stellate-pubescent, simple up to the inflorescence; leaves oblong, sagittate-clasping; racemes elongate; pedicels slender, spreading, 5–9 mm. long; capsule 2–3 mm. in diameter. — Grain fields and waste places, e. Que. to B. C., locally s. to Pa. (Nat. from Eu.) FIG. 752.

752. N. paniculata. Part of fruiting raceme × ⅔. Pod × 1⅓.

13. CAKÌLE [Tourn.] Ludwig. SEA ROCKET

Pod short, 2-jointed across, fleshy, upper joint separating at maturity; each joint indehiscent, 1-celled and 1-seeded, or the lower sometimes seedless. Seed erect in the upper, suspended in the lower joint. Cotyledons obliquely accumbent. — Seaside fleshy annuals. Flowers purplish. (An old Arabic name.)

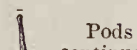
1. **C. edéntula** (Bigel.) Hook. (AMERICAN S.) Leaves obovate, sinuate and toothed; lower joint of the fruit obovoid, emarginate; the upper ovate, flattish at the apex. (*C. americana* Nutt.) — Atlantic coast and shores of the Great Lakes. July–Sept. — Joints nearly even and fleshy when fresh; the upper one 4-angled and appearing more beaked when dry.

14. RÁPHANUS [Tourn.] L. RADISH

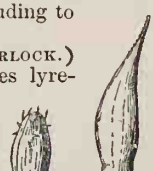
Pods linear or oblong, tapering upward, indehiscent, several-seeded, continuous and spongy within between the seeds, or necklace-form by constriction between the seeds, with no proper partition. Style long. Seeds spherical and cotyledons conduplicate. — Annuals or biennials. (Name from ῥᾳ, *quickly*, and φαίνεσθαι, *to appear*, alluding to the rapid germination.)

1. **R.** RAPHANÍSTRUM L. (WILD R., JOINTED CHARLOCK.) Pods 2–8 seeded, necklace-form, slender-beaked; leaves lyre-shaped, rough; petals yellow, turning whitish or purplish, veiny. — A troublesome weed in fields, Nfd. to Ont. and Pa. (Nat. from Eu.) FIG. 753.

2. **R.** SATÌVUS L. (RADISH.) Petals pale purple; pods thick, scarcely moniliform, 2–3-seeded, with conical beak. — Persistent about old fields, frequent. (Introd. from Eu.) FIG. 754.



753. R. Raphanistrum. Pod × ⅔. Bud × 1⅓.



754. R. sativus. Bud × 1⅔. Pod × ⅔.

15. BRÁSSICA [Tourn.] L. MUSTARD. TURNIP

Pod slender or thickish, nearly terete or 4-sided, with a stout often 1-seeded beak; valves 1–5-nerved. Seeds globose, 1-rowed. Cotyledons conduplicate.

— Annuals or biennials, with yellow flowers. Lower leaves mostly lyrate, incised, or pinnatifid. (The Latin name of the Cabbage.)

* *Beak of the pod large, flat or conspicuously angled, usually containing one seed in an indehiscent cell; leaves not clasping at the base.*

1. B. ÁLBA (L.) Boiss. (WHITE M.) *Pods bristly*, ascending on spreading pedicels, *more than half their length occupied by the sword-shaped beak;* leaves all pinnatifid; seeds pale. (*Sinapis* L.) — Cultivated, and occasionally spontaneous. (Introd. from Eu.)

755. B. arvensis. Stem-leaf and part of fruiting raceme × ⅓.

2. B. ARVÉNSIS (L.) Ktze. (CHARLOCK.) *Knotty pods fully one third occupied by a stout 2-edged beak;* upper leaves rhombic, scarcely petioled, merely toothed; *fruiting pedicels short, thick; pods smooth or rarely bristly*, 4 cm. long. (*B. Sinapistrum* Boiss.; *Sinapis arvensis* L.) — Noxious weed in grain-fields, etc. (Nat. from Eu.) FIG. 755.

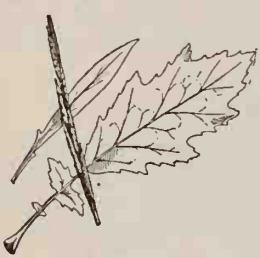
** *Beak smaller, conical, seedless; leaves not clasping.*

756. B. juncea. Stem-leaf and part of fruiting raceme × ⅓.

3. B. JÚNCEA (L.) Cosson. *Nearly glabrous*, somewhat *glaucous;* upper leaves oblong, subentire, attenuate at the base; the lower lyrate; *pedicels slender, spreading; pod at length 3.5 cm. long.* — Roadsides, grain-fields, etc., recently introduced but already common. (Nat. from Asia.) FIG. 756.

4. B. JAPÓNICA Siebold. (CURLED M.) *Leaves crisped and much cleft;* otherwise similar to the last. — Occasionally established after cultivation. (Introd. from Asia.)

5. B. NÌGRA (L.) Koch. (BLACK M.) *Hirsute* with scattered hairs, *green;* leaves slender-petioled, the lower with a very large terminal lobe and a few small lateral ones; *pods short*, 1.5–1.8 *cm. long, on short erect pedicels, appressed;* seeds dark, very pungent. — Roadsides and waste places, common. (Nat. from Eu.) FIG. 757.



757. B. nigra. Leaves and part of fruiting raceme × ½.

*** *Leaves cordate- or auriculate-clasping at the base.*

6. B. CAMPÉSTRIS L. (RUTABAGA.) Glaucous, hispidulous with scattered hairs at least when young; leaves lyrately lobed; flowers rather large, pale yellow (FIG. 758); also B. NÀPUS L. (RAPE), which is very similar but entirely glabrous; and B. RÀPA L. (TURNIP), which is greener, and has smaller brighter yellow flowers and a thickened root; all tend to escape from or persist after cultivation, and are often noxious weeds. (Introd. from Eu.) B. OLERÀCEA L. (CABBAGE), with broad fleshy glaucous leaves, is occasionally found in a half-wild state. (Introd. from Eu.)

758. B. campestris. Stem-leaf and part of fruiting raceme × ⅓.

16. DIPLOTÁXIS DC.

Seeds ovoid, in two rows in each cell; other characters as in *Brassica.* — Leaves toothed or pinnatifid; flowers yellow. (Name from the Greek, alluding to the biseriate seeds.)

1. D. MURÀLIS (L.) DC. *Annual* or biennial, smooth or sparingly hispid, leafy only near the branching base; leaves oblong, toothed or somewhat pin-

natifid with short lobes; flowers small; fruiting *pedicels* 8–16 *mm. long*, spreading; pods linear-terete, erect. — About Atlantic ports, and rarely inland. (Adv. from Eu.)

2. D. TENUIFÒLIA (L.) DC. Similar but *perennial* and more caulescent; leaves pinnatifid, and lobes longer; flowers larger, 1 cm. long; *pedicels* in fruit 2–3 *cm. long.* — Similar localities. (Adv. from Eu.)

17. CONRÍNGIA [Heist.] Link. HARE'S-EAR MUSTARD

Pods long, linear, 4-angled, somewhat rigid. Seeds oblong, one row in each cell. Cotyledons incumbent. — Glabrous annuals with sessile elliptic entire stem-clasping leaves. (Named for *Prof. Hermann Conring* of Helmstadt, 1606–1661.)

1. C. ORIENTÀLIS (L.) Dumort. Tall, slightly succulent; flowers pale yellow. (*C. perfoliata* Link.) — Waste places and newly seeded ground, becoming more common. (Adv. from Eu.)

18. ALLIÀRIA Adans. GARLIC MUSTARD

Pods long, linear, angled; valves keeled, 3-nerved; stigma simple, sessile or nearly so. Oval sepals caducous. Pubescence simple or none. — Ours biennial with deltoid-ovate cordate dentate petiolate leaves and small white flowers. (Name from *Allium*, onion or garlic, referring to the odor.)

1. A. OFFICINÀLIS Andrz. Tall; pods 2.5–5 cm. long, spreading, borne on short thick pedicels. (*A. Alliaria* Britton.) — Roadsides and near habitations, eastw., local. (Introd. from Eu.)

19. SISÝMBRIUM [Tourn.] L. HEDGE MUSTARD

Pod terete, flattish or 4–6-sided, the valves 1–3-nerved. Seeds oblong, marginless, in 1 or 2 rows in each cell. Cotyledons incumbent. Calyx open. — Flowers small, white or yellow. Pubescence spreading. (Latinized from an ancient Greek name for some plant of this family.) Ours are mostly annuals or biennials.

Leafy-stemmed; leaves pinnate or pinnatifid.	
Stigma 2-lobed; pubescence, when present, of simple hairs.	
Pods awl-shaped, 1–1.5 cm. long	1. *S. officinale.*
Pods linear-cylindric, longer.	
Pods firm, 6–10 cm. long	2. *S. altissimum.*
Pods delicate, 3–4 mm. long	3. *S. Irio.*
Stigma simple; pubescence forked or stellate, or reduced to minute granules; pods delicate.	
Seeds 2-ranked in each cell	4. *S. canescens.*
Seeds 1-ranked in each cell.	
Leaves pinnatifid or bipinnatifid; pods 6–15 mm. long	5. *S. incisum.*
Leaves tripinnate; pods about 2 cm. long	6. *S. Sophia.*
Leaves chiefly basal, entire or barely toothed	7. *S. Thalianum.*

759. S. officinale. Leaf × ⅔.

1. S. OFFICINÀLE (L.) Scop. Leaves runcinate; flowers small, yellow; *pods thick-walled*, at maturity firm in texture, *pubescent or tomentulose*, *close-pressed to the* few-branched *stem*, scarcely stalked. — Waste ground, Me. and Ont., local; also Cal., etc. (Adv. from Eu.) FIG. 759.

Var. LEIOCÁRPUM DC. *Pods essentially glabrous.* — A common and unsightly weed. (Nat. from Eu.)

2. S. ALTÍSSIMUM L. (TUMBLE MUSTARD.) Tall; *leaves* deeply pinnatifid *with narrow segments;* flowers pale yellow; *pods rigid*, very long, divergent, *hardly thicker than the short thickish pedicels.* — Waste places, roadsides, etc., a recent immigrant, locally abundant as a pernicious weed. (Nat. from Eu.) FIG. 760.

760. S. altissimum. Leaf and part of fruiting raceme × ⅓.

3. **S. Ìrio L.** Similar; *leaves* runcinate-pinnatifid, *the terminal portion large; pods* ascending *on slender pedicels.* — Meadow, Grand Rapids, Mich. (*Miss Cole*); ballast at Atlantic ports. (Adv. from Eu.)

4. **S. canéscens** Nutt. *Leaves* pinnatifid to tripinnatifid, *canescent* with soft short hairs; flowers yellowish, very small; pods in long racemes, oblong-club-shaped or linear-cylindric, shorter than the horizontal pedicels; *seeds 2-ranked in each cell.* (*Sophia pinnata* Howell.) — Pa. to Fla. and westw. — Passing by various intermediates to

Var. **brachycárpon** (Richards.) Wats. *Green; stems* at most cinereous-stellate at base, *usually glabrous or glandular-pulverulent.* (*Sophia* Rydb.) — Que. to Assina., s. to Ky., Mo., Kan., etc.

5. **S. incìsum** Engelm. Similar; green or greenish; *pods* more slender, 7–15 *mm. long*, about equaling the spreading pedicels; *seeds mostly 1-ranked.* (*Sophia* Greene.) — A western polymorphous species, extending eastw. to Ont. and Minn.

Var. **fílipes** Gray. Pedicels thread-like, spreading, much exceeding the pods. — Minn., and westw.

Var. **Hartwegiànum** (Fourn.) Wats. The very numerous short pods on still shorter suberect pedicels. — Minn., and westw.

6. **S. Sòphia L.** A similar hoary species, with decompound leaves; *pods slender, about 2 cm. long*, ascending; *seeds 1-ranked.* (*Sophia* Britton.) — Sparingly in waste places. (Nat. from Eu.)

7. **S. Thaliànum** (L.) J. Gay. (Mouse-ear Cress.) Slender, branched, hairy at the base; *leaves* obovate or oblong, *entire or barely toothed; flowers white;* pods linear, somewhat 4-sided, longer than the slender spreading pedicels. (*Stenophragma* Čelak.) — Old fields and rocky places, Mass. to "Minn.," Kan. and southw. Apr., May. (Nat. from Eu.)

20. BRÀYA Sternb. & Hoppe

Pods cylindric to linear, often torulose, the septum of peculiar and characteristic structure with its cells elongated transversely or obliquely. Flowers white or purplish, capitate in anthesis. — Arctic perennials with single root and branched hairs. (Named for *Count F. G. de Bray* of Rouen.)

1. **B. hùmilis** (C. A. Mey.) Robinson. Sparingly pubescent, 1–2 dm. high or less; leaves narrowly oblanceolate, mostly with coarse and sharp teeth; pods narrow, subcylindrical, 8–18 mm. long, ascending on short pedicels, beaked by a short style; seeds 1-ranked. (*Sisymbrium* C. A. Mey.) — Limestone cliffs, Willoughby Mt., n. Vt., Isle Royale, Mich., and northw.; and in the Canadian Rocky Mts. (Siber.)

21. HÉSPERIS [Tourn.] L. Rocket

Pod linear, nearly cylindrical; stigma lobed, erect. Seeds in 1 row in each cell, oblong, marginless. Cotyledons incumbent. — Biennial or perennial, with serrate sessile or petiolate leaves, and large purple flowers. (Name from *ἑσπέρα, evening,* from the evening fragrance of the flowers.)

1. **H. matronàlis** L. (Dame's Violet.) Tall; leaves lanceolate, acuminate; pods 5–10 cm. long, spreading. — Sometimes cultivated, and spreading to roadsides, etc. (Introd. from Eu.)

22. ERÝSIMUM [Tourn.] L. Treacle Mustard

Pod linear, 4-sided, the valves keeled with a strong midrib; stigma broadly lobed. Seeds in 1 row in each cell, oblong, marginless. Cotyledons in ours (often obliquely) incumbent. — Chiefly biennials, with yellow flowers; the leaves not clasping. Pubescence of appressed 2–3-parted hairs. (Name from *ἐρύειν, to draw blisters.*)

761. E. cheiranthoides. Leaf and part of fruiting raceme × ⅔.

1. **E. cheiranthoides** L. (Worm-seed Mustard.) Minutely roughish, branching, slender; leaves lanceolate, scarcely toothed; flowers small; *pods* small and *short* (1–2 *cm. long*), very obtusely angled, ascending on slender *divergent pedicels.* — Banks of streams or in open sterile soil. July, Aug. (Eu.) Fig. 761.

2. **E. parviflòrum** Nutt. *Perennial;* stem erect, often simple; *leaves* linear-oblanceolate, *entire* or the lowest coarsely toothed; *flowers small* (6 *mm. long*); *pods* narrow, 2.5–6.2 *cm. long, ascending on short pedicels.* (*E. inconspicuum* MacM.; *E. syrticolum* Sheldon). — Ont. and Minn. to Kan. and westw. Fig. 762.

762. E. parviflorum. Leaf and part of fruiting raceme × ⅔.

3. **E. repándum** L. Resembling the last, but *annual; leaves repand-denticulate;* flowers 7–9 mm. long; pods 4–8 cm. long, slender, divergent, on very short thick pedicels. — Waste places, O. to Mo. and Kan.; and about Atlantic ports. (Adv. from Eu.)

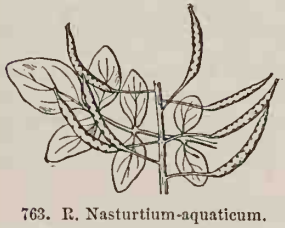
4. **E. ásperum** DC. (Western Wall-flower.) Plant stout, 3–6 dm. high, minutely roughish-hoary; stem simple; leaves lanceolate to linear, entire or somewhat toothed; the bright orange-yellow flowers crowded; *petals* 1.5–2.5 *cm. long*, orbicular, on very slender claws; *pods nearly erect* or widely spreading *on short pedicels, elongated* (7–10 cm. long), exactly 4-sided; stigma 2-lobed. — Nfd. (*Waghorne*); Mingan I., Que. (*Macoun*); O. (on limestone cliffs) to Ark., S. Dak., and common westw. June, July.

23. RADÍCULA [Dill.] Hill. Water Cress

Pod a short silique or a silicle, varying from slender to globular, terete or nearly so; valves strongly convex, nerveless. Seeds usually numerous, small, turgid, marginless, in 2 irregular rows in each cell (except in *R. sylvestris*). Cotyledons accumbent. — Aquatic or marsh plants, with yellow or white flowers, and commonly pinnate or pinnatifid leaves, usually glabrous. (Name meaning a *little radish.*) Roripa Scop. Nasturtium R. Br.

§ 1. *Petals white, twice the length of the calyx; pods linear; leaves pinnate.*

1. R. Nastúrtium-aquáticum (L.) Britten & Rendle. (True W.) Perennial; stems spreading and rooting; leaflets 3–11, roundish or oblong, nearly entire; pods (1.2–1.6 cm. long) ascending on slender widely spreading pedicels. (*Sisymbrium* L.; *Nasturtium officinale* R. Br.; *Roripa Nasturtium* Rusby.) — Brooks, ditches, etc., originally cultivated. (Nat. from Eu.) Fig. 763.



763. R. Nasturtium-aquaticum. Leaf and part of fruiting raceme × ⅔.

§ 2. *Petals yellow or yellowish, seldom much exceeding the calyx; pods linear, short-cylindric, or even ovoid or globular; leaves mostly pinnatifid.*

* *Perennial from creeping or subterranean shoots; flowers rather large, yellow.*

2. R. sylvéstris (L.) Druce. (Yellow Cress.) Stems ascending; *leaves pinnately parted*, the divisions toothed or cut, lanceolate or linear; pods (6–12 mm. long) on slender pedicels, linear and narrow, bringing the seeds into one row; *style very short.* (*Nasturtium* R. Br.; *Roripa* Bess.) — Wet meadows. Nfd. to Va., westw. to Ont., Mich., and Ill.; becoming more frequent. (Nat. from Eu.)

3. **R. sinuàta** (Nutt.) Greene. Stems low, diffuse; *leaves pinnately cleft*, the short lobes nearly entire, linear-oblong; pods linear-oblong (6–10 mm. long), on slender pedicels; *style slender*. (*Nasturtium* Nutt.; *Roripa* Hitchc.) — Banks of the Miss. and westw. June. Fig. 764.

764. R. sinuata. Leaves and part of fruiting raceme × ⅔.

** *Annual or biennial, rarely perennial* (?), *with simple fibrous roots; flowers small or minute, greenish or yellowish; leaves somewhat lyrate.*

4. **R. sessiliflòra** (Nutt.) Greene. Stems erect, rather simple; *leaves obtusely incised* or toothed, obovate or oblong; *flowers minute, nearly sessile;* pods elongate-oblong (1–1.2 cm. long), thick; style very short. (*Nasturtium* Nutt.; *Roripa* Hitchc.) — Richmond, Va. (*Churchill*) to Neb., e. Kan. and southw. Apr.–June.

5. **R. obtûsa** (Nutt.) Greene. Stems much branched, diffusely spreading; *leaves pinnately parted or divided*, the divisions roundish and obtusely toothed or repand; *flowers minute, short-pediceled; pods longer than the pedicels*, varying from linear-oblong to short-oval; style short. (*Nasturtium* Nutt.; *Roripa* Britton.) — Low ground, n. Mich. (*Farwell*) to Tex. and westw.

Var. **sphaerocárpa** (Gray) Robinson. Pods globular, about equaling the pedicels. (*Nasturtium* Gray; *Roripa* Britton.) — Ill., and southwestw.

6. **R. palústris** (L.) Moench. (Marsh Cress.) Stem erect, 3–8 dm. high, mostly glabrous; *leaves* pinnately *cleft or parted*, or the upper laciniate; the lobes oblong, cut-toothed; *pedicels about as long as the small flowers and mostly longer than the* short-cylindric ellipsoid or ovoid *pods;* style short. (*Nasturtium* DC.; *Roripa* Bess.) — Wet places or in shallow water; common. June–Sept. (Eurasia.) Fig. 765.

766. R. palustris, var. hispida. Part of fruiting raceme × ⅔.

765. R. palustris. Part of fruiting raceme × ⅔.

Var. **híspida** (Desv.) Robinson. Hirsute; pods globose or nearly so. (*Roripa hispida* Britton; *Nasturtium palustre*, var. Gray.) — With the type; the commoner form eastw. (Eurasia.) Fig. 766.

§ 3. *Petals white, much longer than the calyx; pods ovoid or globular; leaves undivided, or the lower ones pinnatifid; root perennial.*

7. **R. aquática** (Eat.) Robinson. (Lake Cress.) Aquatic; immersed leaves 1–3-pinnately dissected into numerous capillary divisions; emersed leaves oblong, entire, serrate, or pinnatifid; pedicels widely spreading; *pods ovoid, 1-celled, a little longer than the style.* (*Roripa americana* Britton; *Nasturtium lacustre* Gray.) — Lakes and rivers, w. Que. and n. Vt. to Minn. and southw. July–Aug.

8. **R. Armoràcia** (L.) Robinson. (Horseradish.) Root-leaves very large, oblong, crenate, rarely pinnatifid, those of the stem lanceolate; fruiting pedicels ascending; *pods globular* (seldom formed); *style very short.* (*Roripa* Hitchc.) — Escaped from cultivation into moist ground. (Introd. from Eu.) — Roots large and long; a well-known condiment.

24. BARBARÈA R. Br. Winter Cress

Pod linear, terete or somewhat 4-sided, the valves being keeled by a mid-nerve. Seeds in a single row in each cell, marginless. Cotyledons accumbent. — Mostly biennials, resembling *Radicula;* flowers yellow. (Anciently called the Herb of St. Barbara.)

1. **B. vulgàris** R. Br. (Common W., Yellow Rocket.) Smooth perennial; *lower leaves lyrate, the terminal division round* and usually large, *the lateral 1–4 pairs or rarely wanting;* upper leaves obovate, cut-toothed, or pinnatifid at

the base; *flowers* bright yellow, somewhat *racemose even in anthesis; pods* erect or ascending *on spreading pedicels.* (*B. lyrata* Asch.; *B. Barbarea* MacM.)— Low grounds and roadsides; apparently introduced in the Eastern and Central States, but indigenous from L. Superior northw. and westw. (Eu.)

2. B. stricta Andrz. Closely similar in foliage; *flowers* paler, *during anthesis corymbosely aggregated at the summit of the raceme; pods appressed.* — Shores and meadows, e. Que. to Alaska, s. to Va., Great Lake region, Mo., and westw. (Eu.)

3. B. vérna (Mill.) Asch. (Early W.) Leaves with 5–8 *pairs of lateral lobes* and pods longer, on very thick pedicels. (*B. praecox* Sm.) — Somewhat cultivated as a winter salad, under the name of Scurvy Grass, and naturalized from Mass. southw. (Introd. from Eu.)

25. SELÈNIA Nutt.

Pod large, oblong-elliptical, flat; the valves nerveless. Seeds in 2 rows in each cell, rounded, broadly winged; cotyledons accumbent; radicle short. — A low annual, with once or twice pinnatifid leaves and leafy-bracteate racemes of yellow flowers. (Name from σελήνη, *the moon*, with allusion to *Lunaria*, which this genus somewhat resembles in its pods.)

1. S. aúrea Nutt. Lobes of the simply pinnatifid leaves entire or toothed; pod 1.2 cm. long, on elongated spreading pedicels, beaked by the long slender style. — Sandy soil, Mo. and Kan. to Tex.

26. IODÁNTHUS T. & G.

Pod long, linear, somewhat flattened; valves 1-nerved; stigma entire but slightly elongated over the placentae. Seeds 1-ranked in each cell, oblong, marginless. Cotyledons essentially accumbent. — Erect perennial with purplish flowers. (Name from ἰώδης, *violet-colored*, and ἄνθος, *flower*.)

1. I. pinnatífidus (Michx.) Steud. Glabrous, 3–9 dm. high; root-leaves round or heart-shaped, on slender petioles; stem-leaves auricled, ovate-oblong and ovate-lanceolate, sharply and often doubly toothed, tapering to each end, the lower into a winged petiole, rarely bearing a pair or two of small lateral lobes; pods 1.8–3 cm. long, on short diverging pedicels, pointed by a short style. (*Thelypodium* Wats.) — Alluvial river-banks, w. Pa. (*Porter*) to Minn., Mo., and southwestw. Fl. May, June; fr. July, Aug.

27. LUNÀRIA L. Moonwort

Pods very large and flat. Seeds large, winged. Cotyledons accumbent. — Tall herbs with large purple flowers and ovate-deltoid cordate dentate leaves, of which the earliest are opposite. (Name from *luna*, the moon, alluding to the persistent silvery septum of the fruit.)

1. L. ánnua L. (Honesty.) Annual or biennial; *pods* broadly elliptic, *rounded at each end.* — Often cultivated, and escaping in s. w. Ct. and e. Pa. (Introd. from Eu.)

2. L. redivìva L. Perennial; *pods* broadly lance-oblong, somewhat *pointed at each end.* — Also cultivated, and established, it is said, near Niagara. (Introd. from Eu.)

28. LEAVENWÓRTHIA Torr.

Pod broadly linear or oblong, flat; the valves nerveless, but minutely reticulate-veined. Seeds in a single row in each cell, flat, surrounded by a thick wing. Embryo straight or the short radicle only slightly bent in the direction which if continued would make the orbicular cotyledons accumbent. — Little winter annuals, glabrous and often stemless, with lyrate leaves and short 1-few-flowered scape-like peduncles. (Named for *Dr. M. C. Leavenworth*, a southern botanist of the last century.)

1. **L. unifldra** (Michx.) Britton. Scapes 5–15 cm. high; leaf-lobes usually numerous (7–15); petals purplish or nearly white with a yellowish base, obtuse; *pods not torulose*, oblong to linear (1.2–3 cm. long); style short. (*L. Michauxii* Torr.) — Barrens, s. Ind. to Tenn. and Mo.

2. **L. torulòsa** Gray. Similar, but *pods torulose* even when young, linear; style 2–4 mm. long; seeds acutely margined rather than winged; petals emarginate. — Barrens of Ky. and Tenn.

29. DENTÀRIA [Tourn.] L. Toothwort. Pepper-root

Pod lanceolate, flat. Style elongated. Seeds in one row, wingless, the funiculus broad and flat. Cotyledons petioled, thick, very unequal, their margins somewhat infolding each other. — Perennials, of damp woodlands, with long fleshy sometimes interrupted scaly or toothed rootstocks, of a pleasant pungent taste; stems leafless below, bearing 2 or 3 petioled compound leaves about or above the middle, and terminated by a corymb or short raceme of large white or purple flowers. (Name from *dens*, a tooth.)

Stem glabrous.
- Rootstock continuous, prominently toothed . . . . . 1. *D. diphylla.*
- Rootstock interrupted by distinct constrictions.
  - Rootstock elongate, composed of several fusiform or subcylindric distinctly toothed segments.
    - Cauline leaves with ovate or obovate petiolulate leaflets . . . . 2. *D. maxima.*
    - Cauline leaves with lanceolate sessile leaflets . . . . . 3. *D. incisifolia.*
  - Rootstock of readily separable obscurely toothed fusiform tubers . . 4. *D. heterophylla.*

Stem pubescent, at least above.
- Rootstock of readily separable fusiform tubers; sepals 6–9 mm. long.
  - Leaves 3-parted, with linear to oblong segments . . . . . 5. *D. laciniata.*
  - Basal leaves with ovate or rhombic leaflets . . . . . 4. *D. heterophylla.*
- Rootstock elongate, interrupted by constrictions; sepals 3–4 mm. long . 6. *D. unomala.*

1. **D. diphýlla** Michx. *Rootstock long and continuous*, often branched, *the annual segments slightly or not at all tapering at the ends;* stems in anthesis 1.5–3 dm. high, stoutish; *leaves* 3-foliolate, the basal and *cauline* similar, the latter 2 (rarely 3), *opposite or subopposite*, *leaflets* 4–10 *cm. long*, short-petiolulate, rhombic-ovate or oblong-ovate, *coarsely crenate*, *the teeth bluntly mucronate;* flowers white; sepals 5–8 mm. long, half the length of the petals; pods rarely maturing. — Rich woods and thickets, e. Que. to s. Ont. and Minn., s. to S.C. and Ky. Apr., May. — Rootstocks 2–3 dm. long, crisp, tasting like Water Cress. Fig. 767.

767. D. diphylla. Cauline leaves and rootstock × ⅓.

2. **D. máxima** Nutt. *Rootstock* interrupted, *consisting of several elongate strongly toothed segments which are constricted at each end*, the older commonly retaining shreds of old stems; *cauline leaves* 2–3, *alternate*, *often remote*, *leaflets* 2–6 *cm. long*, *ovate or obovate*, *petiolulate*, more or less *ciliolate*, *sharply and coarsely toothed and somewhat cleft;* flowers white or purple-tinged; sepals 5–7 mm. long, half as long as the petals. — By streams in rich woods, local, s. Me. to Mich. and Pa. Apr., May.

3. **D. incisifòlia** Eames. Rootstock much as in the last; *cauline leaves* 2 and *opposite*, rarely 3 and alternate, the *leaflets* 4–9 cm. long, *lanceolate*, *sessile*, *glabrous throughout*, *coarsely incised-dentate;* basal leaves similar, with broader leaflets; flowers white or somewhat purple-tinged; sepals 6–7 mm. long; *petals* 1.5–2 *cm. long.* — Rich hillside woods, Sherman, Ct. (*Eames*). May.

4. **D. heterophýlla** Nutt. *Tubers near the surface;* stems, in anthesis, 1.5–4 dm. high, glabrous or sparingly pubescent above; *cauline leaves* 2–3, *variously disposed*, *the leaflets* 1.5–5.5 cm. long, *distinctly petiolulate*, *oblong-lanceolate to linear*, *ciliate*, entire to deeply crenate, rarely laciniate; *basal leaves with ovate to rhombic-obovate* usually lobed *leaflets;* flowers purplish; sepals purple-tinged,

6–9 mm. long; petals 1–1.8 cm. long. — N. J. and Pa. to Ky., and southw. Apr., May.

5. **D. laciniàta** Muhl. *Tubers deep-seated; stems pubescent above; cauline leaves* 3, *whorled or nearly so, the lateral leaflets deeply cleft*, glabrous or pubescent, *the segments linear to narrowly oblong, conspicuously gash-toothed;* basal leaves, when present, similar; flowers white or purplish; calyx 6–9 mm. long; petals 1–2 cm. long. — Rich damp woods, w. Que. and Vt. to Minn., and southw. Apr., early May. Fig. 768. Var. íntegra (Schulz) Fernald. Leaves strictly ternate, the *lateral leaflets entire or slightly toothed, not cleft.* — N. Y. to Ill.

768. D. laciniata. Cauline leaves and tubers × ¼.

6. **D. anómala** Eames. *Rootstock with pronounced constrictions between the fusiform tuber-like annual segments*, deep-seated; *stems somewhat pubescent; leaves* 3-foliolate, *pubescent on both surfaces;* the *cauline* 2 (rarely 3), *subopposite, their leaflets* 2–5.5 cm. long, short-petiolulate, *ovate to rhombic*, coarsely and irregularly dentate or even incised or cleft; basal leaves, when present, similar; flowers white, tinged with purplish; *sepals* 3–4 *mm. long;* petals 1–1.2 cm. long. — Rich moist woods, Plainville, Ct. (*Bissell*). May. — Perhaps a hybrid of nos. 1 and 5, with which it grows.

30. CARDÁMINE [Tourn.] L. Bitter Cress.

Pod linear, flattened, usually opening elastically from the base; the valves nerveless and veinless, or nearly so; placentae and partition thick. Seeds in a single row in each cell, wingless; the funiculus slender. Cotyledons accumbent, flattened, equal or nearly so, petiolate. — Mostly glabrous perennials, leafy-stemmed, growing along watercourses and in wet places. Flowers white or purple. (A Greek name, used by Dioscorides for some cress, from its cordial or cardiacal qualities.)

** Simple-leaved perennials with tuberous base.*

1. **C. bulbòsa** (Schreb.) BSP. (Spring Cress.) *Stems* upright from a tuberous base and slender rootstock bearing small tubers, simple, or rarely forking, *glabrous, in anthesis* 1.5–5 *dm. high; root-leaves oblong to cordate-ovate, stem-leaves* 5–8, *scattered*, the lower ovate or oblong and somewhat petioled, the upper sessile, almost lanceolate, all often toothed; *sepals greenish*, with white margin; *petals white*, 7–12 *mm. long;* pods linear-lanceolate, pointed with a slender style tipped by a conspicuous stigma; seeds oval. (*C. rhomboidea* DC.) — Wet meadows and springs, e. Mass. to Minn., and southw. May, June.

2. **C. Douglássii** (Torr.) Britton. Similar; *stem* usually somewhat *pubescent, in anthesis* 1–2.5 *dm. high; root-leaves orbicular or suborbicular; stem-leaves* 2–6, the *upper* border (ovate to oblong), *more or less approximate; sepals purple-tinged; petals rose-purple*, 1–1.8 *cm. long.* (*C. rhomboidea*, var. *purpurea* Torr.) — Rich low woods, Ct. to s. Ont. and Wisc., s. to Md. and Ky. Apr., early May.

*** Fibrous-rootèd perennials with 1–3-foliolate leaves; southern.*

3. **C. rotundifòlia** Michx. (Mountain Water Cress.) *Stems branching, weak or decumbent, making long runners; root fibrous;* leaves all much alike, roundish, somewhat angled, often heart-shaped at the base, petioled; pods small, linear-awl-shaped, equaled or exceeded by the pedicels; style slender; *seeds oval-oblong.* — Cool shaded springs, Carrollton, N. Y. (*Peck*) and Middletown, N. J. (*Willis*) to Ky., and southw. along the mts. May, June. — Flowers white, smaller than in no. 1.

4. **C. Clematìtis** Shuttlw. Glabrous and lax, with *slender rootstock;* small radical leaves kidney- or heart-shaped, with or without a pair of smaller lateral

leaflets; stem-leaves on *sagittately appendaged petioles;* terminal leaflet mostly 3-lobed; pods 2.5–3 cm. long, much exceeding the pedicels. — Springy places in the mts., s. Va. and southw.

* * * *Fibrous-rooted alpine perennial with simple leaves; northern.*

5. **C. bellidifòlia** L. *Dwarf* (2–3.5 cm. high), densely tufted; *leaves ovate,* entire, or sometimes with a blunt lateral tooth, 2–10 mm. long, slender-petioled; flowers 1–5, white; pods 1.5–2 cm. long, upright, linear; *style extremely short, stout.* — Arctic regions and alpine districts of the n. hemisphere. Represented with us by

Var. **láxa** Lange. Looser and taller (4–11 cm. high); leaves 6–15 mm. long, on very long petioles; pods 2–3 cm. long. — By alpine brooks, and in cold ravines, Lab. to Mt. Katahdin, Me., and Mt. Washington, N. H.; by a brook, W. Baldwin, Me. (*Miss Furbish*). June, July. (Greenl.)

* * * * *Root perennial; leaves pinnate; flowers showy.*

6. **C. praténsis** L. (Cuckoo Flower.) Stem ascending from a short root-stock, simple; leaflets numerous, those of the lower leaves rounded and stalked, of the upper oblong or linear, entire, or slightly angle-toothed; petals (white or rose-color) thrice the length of the calyx; pod 2–3 cm. long, 2 mm. broad; style short. — Wet places and bogs, Lab. to Vt., N. J., Minn., and northw.; rare. May. Also introduced or a local escape in e. and s. N. E. (Eu.)

* * * * * *Root mostly biennial or annual; leaves pinnately* 5–11-*foliolate; flowers small, white.*

← *Stamens* 4; *leaflets strigose-hispid upon the upper surface.*

7. **C. hirsùta** L. Leaves chiefly radical, with short and broad leaflets, but those on the erect stem reduced and with narrow leaflets; pods erect, on ascending or appressed pedicels. — Moist places, s. Pa. to N. C., and "Mich." (Eu.) Perhaps introduced. A doubtful specimen from w. Mass. (*Miss Vail*).

← ← *Stamens normally* 6; *leaflets glabrous; stem leafy.*

8. **C. parviflòra** L. Very slender, subsimple, glabrous or slightly pubescent upon the stem; *leaflets* of the radical leaves oval or the terminal suborbicular; those *of the cauline very narrow, linear, not confluent;* pods erect, on ascending pedicels. (*C. hirsuta*, var. *sylvatica* of some Am. auth.) — Rocky and barren soil, Me. to Ga. and westw. (Eu.) A form more branched from the base and with leaflets all narrow and often toothed has been described as *C. arenicola* Britton, growing in sandy soil in the Atlantic States but lacking constant characters.

9. **C. pennsylvánica** Muhl. Larger, nearly or quite glabrous; *leaflets* 7–11, the terminal one obovate, *the lateral oblong, tending to be confluent along the rhachis;* pods erect, on ascending pedicels. (*C. hirsuta* Man. ed. 6, in great part.) — Moist ground, common. Passes imperceptibly into a form (*C. flexuosa* Britton, perhaps Withering) with fewer more flabelliform leaflets and spreading pods. — Brooks, etc.

31. ÁRABIS L. Rock Cress

Pod linear, flattened; placentae not thickened; the valves plane or convex, more or less 1-nerved in the middle, or longitudinally veiny. Seeds marginless or winged. Cotyledons accumbent or a little oblique. — Leaves seldom divided. Flowers white or purple (rarely yellowish). (Name from the country, *Arabia.*)

§ 1. SISYMBRÌNA Wats. *Seeds oblong or elliptical, very small, wingless, in one row; cotyledons often more or less oblique; biennial or perennial, branching from base.*

1. **A. lyràta** L. Mostly glabrous, except the *lyrate-pinnatifid root-leaves;* stem-leaves scattered, spatulate or linear with a tapering base, sparingly toothed

or entire; *petals white*, much longer than the yellowish calyx; pods long and slender, flat, ascending or spreading; style slender, 0.8 mm. long. — On rocks or sandy shores, w. N. E. to Man., and southw. Apr.–July. — Usually biennial, but southw. decidedly perennial. Var. OCCIDENTÀLIS Wats. Stigma sessile or on a very short thick style (0.5 mm. or less in length). — Point Pelee, n. shore of L. Erie; Rocky Mts. to Alaska. (Kamchatka.)

2. **A. dentàta** T. & G. Roughish-pubescent, slender; *leaves oblong*, very obtuse, unequally and sharply toothed; those of the stem *numerous, half-clasping and auricled*, of the base broader and tapering into a short petiole; petals (whitish) scarcely exceeding the calyx; *pods widely spreading, very slender, short-stalked; style scarcely any.* — N. Y. to Minn., Neb., and southw. May, June.

3. **A. glàbra** (L.) Bernh. (TOWER MUSTARD.) Tall (6–12 dm. high), *glaucous;* stem-leaves oblong or ovate-lanceolate, entire; *petals yellowish white, little longer than the calyx; pods very narrow* (8 cm. long) *and pedicels strictly erect;* seeds marginless; cotyledons often oblique. (*A. perfoliata* Lam.) — Rocks and fields, N. B. to B. C., s. to N. J., Pa., Great Lake region, S. Dak., Utah and Cal. May–July. (Eu.)

§ 2. TURRÌTIS [Dill.] Gaudin. *Seeds not so broad as the partition, in two more or less distinct rows in each cell, at least when young; strict and very leafy-stemmed biennials; cauline leaves partly clasping by a sagittate base.*

Calyx essentially glabrous; pods erect or loosely spreading.
Pubescence of the basal rosettes none or sparse and of simple or of 2-pointed hairs attached by the middle . . . . . 4. *A. Drummondi.*
Pubescence of the basal rosettes dense, stellate . . . . . 5. *A. brachycarpa.*
Calyx stellate-pubescent; pods deflexed or pendulous . . . . . 6. *A. Holboellii.*

4. **A. Drummóndi** Gray. *Nearly glabrous*, somewhat glaucous, 3–9 dm. high; *stem-leaves* oblong or narrowly lanceolate, the *basal spatulate-lanceolate;* pods straightish, 3.5–10 cm. long, 1.3–2.3 mm. broad. (*A. confinis* Wats., in great part.) — Rocky places, e. Que. to B. C., s. to N. S., s. N. E., N. Y., O., Ill., Utah, and Ore.

Var. **connéxa** (Greene) Fernald. Stout; pods 3–3.3 mm. wide. — Rivière du Loup, Que.; and mts. of w. N. A.

5. **A. brachycárpa** (T. & G.) Britton. Similar in stature and habit; *basal leaves densely pubescent with 3-pointed hairs*, the cauline glabrous; *pedicels widely spreading;* pods 1.7–9 cm. long, 1–2 mm. broad, widely spreading. (*A. confinis* Wats., in part; *Turritis brachycarpa* T. & G.) — Sandy woods, rocky banks, etc., e. Que. to Sask. and Assina., s. to N. B., n. Vt., N. Y., Great Lake region, Col., etc.

6. **A. Holboéllii** Hornem. *Stems* 1–several, 2–9 dm. high, leafy, somewhat *closely stellate-pubescent at the base, glabrous or glabrate above;* pedicels soon deflexed; petals pink or pinkish, 7–10 mm. long; *pods* 4–8 cm. long, 1.5–2.5 mm. broad, *blunt, secund and strongly deflexed.* — Rocky (calcareous) or sandy places, e. Que.; Thunder Bay, L. Huron (*Wheeler*) to the mts. of B. C. and Cal. (Greenl.)

§ 3. ÁRABIS proper. *Seeds in one row in each cell, orbicular or nearly so, more or less wing-margined; cotyledons strictly accumbent.*

* *Low, chiefly biennials, diffuse or spreading from the base.*

7. **A. virgínica** (L.) Trel. Nearly glabrous, often annual; leaves all pinnately parted into oblong or linear few-toothed or entire divisions, those of the lower leaves numerous; pedicels very short; flowers small, white; pods rather broadly linear, spreading, flat; seeds winged. (*A. ludoviciana* Mey.) — Open ground, Va. to Kan., and southw. Mar.–May.

** *Erect leafy-stemmed biennials, with simple leaves, white or whitish flowers, narrow but flattened ascending or erect pods, and nearly wingless seeds.*

8. **A. pàtens** Sulliv. Downy with spreading hairs, erect (3–6 dm. high); stem-leaves oblong-ovate, acutish, coarsely toothed or the uppermost entire,

partly clasping by the heart-shaped base; petals (bright white, 8 mm. long) the length of the calyx; *pedicels slender, spreading; pods spreading or ascending, tipped with a distinct style.* — Pa. to Minn. and southw. Apr., May.

9. **A. hirsùta** (L.) Scop. Rough-hairy, sometimes smoothish, strictly erect; stem-leaves oblong or lanceolate, entire or toothed, partly clasping by a somewhat arrow-shaped or heart-shaped base; petals (greenish white) small, but longer than the calyx; *pedicels and pods strictly upright; style scarcely any;* immature seeds somewhat 2-rowed. — Gravelly shores and calcareous rocks, especially northw. May, June. (Eu.)

* * * *Erect leafy-stemmed biennials* (3–9 *dm. high*), *with small whitish flowers, recurved-spreading or pendulous flat pods* (7–10 *cm. long*), *and broadly winged seeds, the funiculus adherent to the partition; root-leaves rarely lyrate.*

10. **A. laevigàta** (Muhl.) Poir. *Smooth* and glaucous, upright; *stem-leaves partly clasping* by the arrow-shaped base, lanceolate or linear, mostly toothed, sometimes (var. LACINIÀTA T. & G.) incised; petals scarcely longer than the calyx; *pods long and narrow, recurved-spreading* on ascending or merely spreading pedicels. — Rocky places, w. Me. to S. Dak. and southw. May.

Var. **Búrkii** Porter. Leaves narrower, those of the stem essentially entire, not auricled at the base. — Dry hills, Pa. to Va.

11. **A. canadénsis** L. (SICKLE-POD.) Stem upright, smooth above; *stem-leaves pubescent, pointed at both ends,* oblong-lanceolate, sessile, the lower toothed; petals twice the length of the calyx, oblong-linear; *pods very flat, scythe-shaped* (4 mm. wide), *hanging* on rough-hairy pedicels. — Rocky woods and ravines, e. Mass. and Vt. to Ont., and southw. June–Aug.

CAPPARIDÀCEAE (CAPER FAMILY)

Herbs (when in northern regions) *with cruciform flowers, but 6 or more not tetradynamous stamens, a 1-celled pod with 2 parietal placentae, and kidney-shaped seeds.* — Pod as in *Cruciferae*, but with no partition; seeds similar, but the embryo coiled rather than folded. Leaves alternate, mostly palmate. Often with the acrid or pungent qualities of *Cruciferae* (as in *capers*, the flower-buds of *Capparis spinosa*).

* Pod sessile or short-stiped; stamens 6–∞.

1. **Polanisia.** Petals subequal, emarginate.

* * Pod long-stiped; stamens 6.

2. **Cleome.** Stamens 6. Pod linear, many-seeded, long-stipitate.

1. POLANÍSIA Raf.

Petals with claws, notched at the apex. Stamens 8–32, unequal. Receptacle not elongated, bearing a gland behind the base of the ovary. Pod linear or oblong, veiny, turgid, many-seeded. — Fetid annuals, with glandular or clammy hairs. Flowers in leafy racemes. (Name from πολύ-, *many*, and ἄνισος, *unequal*, points in which the genus differs in its stamens from *Cleome*.)

1. **P. gravèolens** Raf. Leaves with 3 oblong leaflets; stamens about 11, scarcely exceeding the petals; style short; pod slightly stipitate. — Gravelly shores and banks, w. Que. to Chesapeake Bay, and westw. June–Aug. — Flowers small (4–6 mm. long); calyx and filaments purplish; petals yellowish white.

2. **P. trachyspérma** T. & G. Flowers larger (8–10 mm. long); the stamens (12–16) long-exserted; style 4–6 mm. long; pod sessile; seeds usually rough. — Ia. to Kan., southw. and westw.; also by a stream, Salisbury, Ct. (*Mrs. Phelps, Weatherby*), where probably introduced.

2. CLEÒME L.

Petals entire, with claws. Stamens 6. Receptacle somewhat produced between the petals and stamens, and bearing a gland behind the stipitate ovary. Pod linear to oblong, many-seeded. — Our species annuals with bracteate racemes. (Name of uncertain derivation, early applied to some mustard-like plant.)

1. C. serrulàta Pursh. (Stinking Clover.) Glabrous; leaves 3-foliolate; leaflets lance-oblong, mostly entire; petals white or rose-colored, short-clawed; stipe of pod as long as the pedicel. (*C. integrifolia* T. & G.) — Dry mostly saline soil, Minn. to n. Ill., Mo., Kan., westw. and northwestw.; rarely eastw. along railroads. — Flowers showy.

2. C. spinòsa L. (Spider-flower.) Viscid-pubescent; leaflets 5–7, lanceolate, serrulate; petals white or rose-colored. — Cultivated, and occasionally escaping to waste grounds. (Introd. from the tropics.)

3. C. lùtea Hook. Lower leaves 5-foliolate; flowers yellow. — Western species, reported from Weeping Water, Neb. (*Webber*).

RESEDÀCEAE (Mignonette Family)

Herbs, with unsymmetrical 4–7-merous small flowers, a fleshy 1-sided hypogynous disk between the petals and the (3–40) *stamens, bearing the latter. Calyx not closed in the bud. Capsule 3–6-lobed, 3–6-horned, 1-celled, with 3–6 parietal placentae, opening at the top before the seeds* (which are as in *Capparidaceae*) *are full grown.* — Leaves alternate, with only glands for stipules. Flowers in terminal spikes or racemes. A small and unimportant family of the Old World, represented by the Mignonette (*Reseda odorata*) and the Dyer's Weed.

1. RESÈDA [Tourn.] L. Mignonette. Dyer's Rocket

Petals 4–7, cleft, unequal. Stamens 12–40, on one side of the flower. (Name from *resedare*, to calm, in allusion to supposed sedative properties.)

1. R. Lutèola L. (Dyer's Weed or Weld.) *Leaves lanceolate;* calyx 4-parted; petals 4, greenish yellow; the upper one 3–5-cleft, the two lateral 3-cleft, the lower one linear and entire; capsule depressed. — Roadsides and ballast, Mass. to Pa., local. — Plant 6 dm. high, used for dyeing yellow. (Adv. from Eu.)

2. R. lùtea L. Low, decumbent; *leaves irregularly pinnate-parted or bipinnatifid; flowers pale yellow;* sepals and petals 6; *stamens* 15–20. — Meadows and waste places, Mass. to Pa.; also Mich. (Adv. from Eu.)

3. R. álba L. Tall, erect; *leaves pinnately and rather regularly parted; flowers greenish white; stamens* 12–15; petals 5–6. — Waste places, becoming more common. (Adv. from Eu.)

SARRACENIÀCEAE (Pitcher-plant Family)

Polyandrous and hypogynous bog-plants, with hollow pitcher-formed or trumpet-shaped leaves, — comprising one plant of Guiana, another (*Darlingtonia* Torr.) in California, and the following genus.

1. SARRACÈNIA [Tourn.] L.

Sepals 5, with 3 bractlets at the base, colored, persistent. Petals 5, oblong or obovate, incurved, deciduous. Stamens numerous, hypogynous. Ovary compound, 5-celled, globose, crowned with a short style, which is expanded at the summit into a very broad and petal-like 5-angled 5-rayed umbrella-shaped

body, the 5 delicate rays terminating under the angles in as many little hooked stigmas. Capsule with a granular surface, 5-celled, with many-seeded placentae in the axis, loculicidally 5-valved. Seeds anatropous, with a small embryo at the base of fleshy albumen. — Perennials, yellowish green and purplish; the hollow leaves all radical, with a wing on one side, and a rounded arching hood at the apex. Scape naked, 1-flowered; flower nodding. (Named for *Dr. Michel Sarrasin*, physician at the Court of Quebec early in the 18th century, who sent our northern species to Europe.)

1. **S. purpùrea** L. (Side-saddle Flower, Pitcher-plant, Huntsman's Cup.) *Leaves pitcher-shaped*, ascending, curved, broadly winged; the hood erect, open, round heart-shaped, covered within by reflexed bristles; *flower globose, scapose, deep purple;* the fiddle-shaped petals arched over the greenish yellow style. — Peat-bogs, Lab. to Mackenzie, s. to Fla., Ky., the Great Lake region, and s. e. Ia. June. — The curious leaves are usually half filled with water and drowned insects. Var. heterophýlla (Eat.) Torr., has greenish yellow flowers and no purple veins in the foliage. — With the typical form.

2. **S. flàva** L. (Trumpets.) *Leaves long* (3–10 dm.) *and trumpet-shaped*, erect, with an open mouth, the erect hood rounded, narrow at the base; wing almost none; *flower yellow*, the petals becoming long and drooping. — Bogs, Va. and southw. Apr.

DROSERÀCEAE (Sundew Family)

Bog-herbs, mostly glandular-haired, with regular hypogynous flowers, pentamerous and withering-persistent calyx, corolla, and stamens, the anthers fixed by the middle and turned outward, and a 1-celled capsule with twice as many styles or stigmas as there are parietal placentae. — Calyx imbricated. Petals convolute. Seeds numerous, anatropous, with a short and minute embryo at the base of the albumen. Leaves, in bud, rolled up from the apex to the base as in Ferns. Small family of insectivorous plants.

1. DRÓSERA L. Sundew

Stamens 5. Styles 3, or sometimes 5, deeply 2-parted so that they are taken for 6 or 10, slender, stigmatose above on the inner face. Capsule 3(rarely 5)-valved; the valves bearing the numerous seeds on their middle for the whole length. — Low perennials or biennials; the leaves, in our species, all in a tuft at the base (often scattered in submersed plants), clothed with reddish gland-bearing bristles; the naked scape bearing the flowers (rarely solitary) in a 1-sided simple (or sometimes forking) raceme-like inflorescence, which nods at the undeveloped apex, so that the fresh-blown flower (which opens only in sunshine) is always highest. The plants yield a purple stain to paper. The glands of the leaves exude drops of a clear glutinous fluid, glittering like dew-drops (whence the name, from δροσερός, *dewy*).

Leaf-blades linear to orbicular, usually distinct from the petioles.
- Scapes glabrous.
  - Leaf-blades as broad as or broader than long; seeds spindle-shaped, with a loose testa . . . . . 1. *D. rotundifolia*
  - Leaf-blades distinctly narrower than long.
    - Seeds spindle-shaped, the testa loose and produced at the ends; stipules adnate . . . . . 2. *D. anglica.*
    - Seeds ellipsoid or ellipsoid-ovoid, with a close testa.
      - Leaf-blades spatulate or spatulate-obovate; stipules nearly free . . 3. *D. longifolia.*
      - Leaf-blades linear; stipules adnate to the petioles . . . . . 4. *D. linearis.*
- Scapes glandular; seeds ellipsoid, with a close testa . . . . . 5. *D. brevifolia.*

Leaves filiform, with no distinction of blade and petiole . . . . . 6. *D. filiformis.*

1. **D. rotundifòlia** L. (Round-leaved S.) *Leaves suborbicular or transversely broad-elliptic*, abruptly narrowed into the *spreading hairy petioles*; scape 1–3 dm. high, 1–25-flowered; flowers white (rarely pinkish), 4–7 mm. broad, the parts sometimes in sixes; *seeds very slender, chaff-like.* — Common

in peat-bogs and moist sandy ground, Lab. to Alaska, s. to Pa., the Great Lake region, Minn., and in the mts. to Ala., Mont., and Cal. June–Aug. (Eurasia.)

Var. **comòsa** Fernald. Dwarf; *inflorescence* 1-few-flowered, *usually capitate; calyx crimson or roseate; petals greenish or crimson*, sometimes foliaceous; *carpels*, and sometimes other parts of the flower, *modified to green gland-bearing leaves.* — Marly bogs, Gaspé Co., Que.; and Herkimer and Oneida Cos., N. Y. (*Haberer*).

2. **D. ánglica** Huds. *Leaves erect, linear- to obovate-spatulate, with smooth or sparsely hairy petioles*, the blade 1.5–5 cm. long, 3–7 mm. broad; scapes 0.6–3 dm. high, 1–8-flowered; corolla white; *seeds blackish, loosely faveolate.* (*D. longifolia* L., in part.) — Marly bogs, Nfd. and e. Que. to B. C., s. to Mich., Ida., and n. Cal. June–Aug. (Eurasia, Sandwich I.)

3. **D. longifòlia** L. *Leaves spatulate*, tapering into the long rather erect *naked petioles;* scape 0.2–2 dm. high, 1–20-flowered; flowers white; *seeds reddish brown, with a close papillose coat.* (*D. intermedia* Hayne.) — Bogs and sandy shores, Nfd. to Fla. and La.; and locally inland to the Great L. region. June–Aug. (W. I., Eu.)

4. **D. lineàris** Goldie. *Leaves linear*, obtuse, the blade 1–6 cm. long, 1.5–3 mm. wide, *on naked erect petioles* about the same length; scape 2–10 cm. long, 1–8-flowered; flowers white or pinkish; *seeds black, with a smoothish close coat.* — Marly bogs and springy places, e. Que. to Alberta, locally s. to n. Me., Mich., Wisc., and Minn. June, July.

5. **D. brevifòlia** Pursh. *Leaves spreading*, very delicate, *cuneate-obovate*, 0.5–1.5 cm. long (including the smooth dilated petioles); stipules nearly obsolete; *scape* filiform, *glandular*, 1–10 cm. high, 1–7-flowered; the white *corolla* 1–1.5 *cm. broad.* — Wet banks and ditches, Va. to Fla. and Tex. Apr., May.

6. **D. filifórmis** Raf. *Leaves very long* (1–3 *dm.*) *and filiform*, erect, glandular throughout; *flowers* numerous, *purplish* (0.7–1.5 *cm. broad*); seeds spindle-shaped. — Wet sand, near the coast, Cape Cod, Mass., to Del. June–Sept.

PODOSTEMÀCEAE (River Weed Family)

Aquatics, growing on stones in running water, some with the aspect of Seaweeds, *or others of* Mosses *or* Liverworts; *the minute naked flowers bursting from a spathe-like involucre as in* Liverworts, *producing a 2-3-celled many-seeded ribbed capsule.* — Represented in North America by

1. PODOSTÈMUM Michx. River Weed

Flowers solitary, nearly sessile in a tubular sac-like involucre, destitute of floral envelopes. Stamens 2, borne on one side of the stalk of the ovary, with their long filaments united into one for more than half their length, and 2 short sterile filaments, one on each side; anthers 2-celled. Stigmas 2, awl-shaped. Capsule pedicellate, oval, 8-ribbed, 2-celled, 2-valved. Seeds minute, very numerous, on a thick persistent central placenta, destitute of albumen. — Leaves 2-ranked. (Name from πούς, *foot*, and στήμων, *stamen;* the two stamens being apparently raised on a stalk by the side of the ovary.)

1. **P. ceratophýllum** Michx. Leaves rigid or horny, dilated into a sheathing base, above mostly forked into thread-like or linear lobes. — On rocks in streams, N. B. to Ont., Minn., and southw., local. July–Sept. — A small olive-green plant, of firm texture, resembling a Seaweed, tenaciously attached to loose stones by fleshy disks or processes in place of roots.

CRASSULÀCEAE (Orpine Family)

Herbs, succulent (except in 1 genus), *with perfectly symmetrical flowers; viz., the petals and pistils equaling the sepals or calyx-lobes in number* (3–20), *and the stamens the same or double their number*, — technically different from

Saxifrageae only in this complete symmetry, and in the carpels (in most of the genera) being quite distinct from each other. Also, instead of a perigynous disk, there are usually little scales on the receptacle, one behind each carpel. Fruit dry and dehiscent; the pods (follicles) opening down the ventral suture, many (rarely few)-seeded. Stipules none. Flowers usually cymose, small. Leaves mostly sessile, in *Penthorum* not at all fleshy.

* Not succulent; carpels united, forming a 5-celled capsule.

1. **Penthorum.** Calyx-lobes 5. Petals none. Stamens 10. Pod 5-beaked, many-seeded.

* * Leaves, etc., thick and succulent; carpels distinct.

2. **Tillaea.** Calyx-lobes, petals, stamens, and pistils 3–4. Seeds few–many.
3. **Sedum.** Calyx-lobes, petals, and pistils 4–5. Stamens 8–10. Seeds many.
4. **Sempervivum.** Calyx-lobes, petals, and pistils 6–∞. Stamens mostly twice as many.

1. PÉNTHORUM [Gronov.] L. Ditch Stonecrop

Calyx-lobes 5. Petals rare, if any. Stamens 10. Pistils 5, united below, forming a 5-angled 5-horned and 5-celled capsule, which opens by the falling off of the beaks, many-seeded. — Upright weed-like perennials (not fleshy like the rest of the family), with scattered leaves, and yellowish green flowers loosely spiked along the upper side of the naked branches of the cyme. (Name from πέντε, *five*, and ὅρος, *a mark*, from the quinary order of the flower.)

1. P. sedoìdes L. Leaves lanceolate, acute at both ends. — Open wet places, N. B. to Fla., w. to Minn., e. Kan., and Tex. July–Oct. — Parts of the flower rarely in sixes or sevens.

2. TILLAÈA [Mich.] L.

Calyx-lobes, petals, stamens, and pistils 3–4. Pods 2–many-seeded. — Very small tufted annuals, with opposite entire leaves and axillary flowers. (Named in honor of *Michael Angelo Tilli*, an early Italian botanist.)

1. T. aquática L. Rooting at the base (1–8 cm. high); leaves linear-oblong; *flowers* solitary, *nearly sessile;* calyx half the length of the (greenish white) petals and the narrow 8–10-seeded pods, the latter with a scale at the base of each. (*T. simplex* Nutt.) — Brackish muddy shores, near the coast, local, Que. to Md., and southw; also on the Pacific coast. July–Sept. (Eu., n. Afr.)

2. T. Vaillántii Willd. Similar; *peduncles* slender, *about as long as the leaves.* — P. E. I. (*Churchill*); Nantucket, Mass. (*Mrs. M. P. Robinson, Floyd*). — Perhaps not specifically distinct from the last. (Eu., n. Afr.)

3. SÈDUM [Tourn.] L. Stonecrop. Orpine

Calyx-lobes and petals 4–5. Stamens 8–10. Follicles many-seeded; a little scale at the base of each. — Chiefly perennial smooth and thick-leaved herbs, with cymose or one-sided inflorescence. Petals almost always narrow and acute or pointed. (Name from *sedere*, to sit, alluding to the manner in which these plants fix themselves upon rocks and walls.)

Flowers perfect.
- Leaves thick (from linear-cylindric to thick-ovate).
  - Leaves closely imbricated, thick-ovate; flowers yellow . . . . 1. *S. acre.*
  - Leaves not imbricated, linear-cylindric.
    - Flowers yellow.
      - Central flower of cyme 5-merous and 10-androus, the others 4-merous and 8-androus . . . . . 2. *S. Nuttalianum.*
      - All the flowers 5-merous and 10-androus . . . . . 7. *S. reflexum.*
    - Flowers white to purplish . . . . . 8. *S. pulchellum.*
- Leaves flat and broad.
  - Cauline leaves opposite or whorled.
    - Leaves entire, chiefly in whorls of 3; flowers white . . . . . 4. *S. ternatum.*
    - Leaves crenate, opposite; flowers pink or purplish . . . . 6. *S. stoloniferum.*
  - Cauline leaves alternate or spirally arranged.

Low slender plant with basal rosettes; cyme loose, of 3 scorpioid branches . . . . . 5. *S. Nevii.*
Coarse upright plants without rosettes; flowers in a dense corymb.
Follicles long-attenuate . . . . . 8. *S. telephioides.*
Follicles abruptly pointed . . . . . 9. *S. purpureum.*
Flowers dioecious, mostly 4-merous and 8-androus . . . . . 10. *S. roseum.*

1. **S. Acre** L. (Mossy S.) Spreading on the ground, moss-like; *leaves* very small, alternate, *imbricated* on the branches, ovate, *very thick; petals yellow.* — Escaped from cultivation to rocky roadsides, etc., e. Que. to Ont., and Va. June, July. (Nat. from Eu.)

2. **S. Nuttalliànum** Raf. Annual; stems simple or branched from the base, 5–10 cm. high; *leaves flat* or teretish, scattered, *oblong*, 4–6 mm. long; petals rather longer than the *ovate sepals;* carpels at length widely divergent. (*S. Torreyi* Don.) — Dry ground, Mo. to Ark. and Tex. May.

3. **S. pulchéllum** Michx. Stems ascending or trailing, 1–3 dm. high; *leaves terete, linear-filiform*, much crowded; spikes of the cyme several, densely flowered; *petals rose-purple.* — On rocks, Va. to Ga., w. to Ind., e. Kan., and Tex.; also cultivated. May, June.

4. **S. ternàtum** Michx. Stems spreading, 7–15 cm. high; *leaves flat, the lower whorled in threes, wedge-obovate*, the upper scattered, *oblong;* cyme 3-spiked, leafy; *petals white.* — Rocky woods, Ct. to Ga., w. to Mich., Ind., and Tenn. May.

5. **S. Nèvii** Gray. Stems spreading, simple (7–13 cm. high); *leaves all alternate*, those of the sterile shoots *wedge-obovate or spatulate*, on flowering stems *linear-spatulate* and flattish; cyme about 3-spiked, densely flowered; *petals white*, pointed. — Rocks, mts. of Va. to Ala. and Ill. May, June.

6. **S. stolonìferum** Gmel. Low perennial, with stoutish decumbent stems, the flowering branches ascending, 1–2 dm. high; *leaves opposite*, obovate, *crenate* above the cuneate base; *cyme* rather dense, the short *branches numerous;* flowers about 1 cm. broad; *petals pink or purplish.* — Roadsides and fields, local, N. S. and Me. June, July. (Introd. from Asia.)

7. **S. reflèxum** L. Glabrous, erect, 3 dm. high; *leaves* crowded, cylindric, *subulate-tipped, spreading, or reflexed; flowers yellow*, pediceled. — Local, e. Mass. and w. N. Y., rare. (Adv. from Eu.)

8. **S. telephioìdes** Michx. Stems ascending, 1.5–3 dm. high, stout, leafy to the top; leaves oblong or oval, entire or sparingly toothed; cyme small; *petals flesh-color*, ovate-lanceolate, taper-pointed; *follicles tapering into a slender style.* — Sandstone knobs and cliffs, from w. N. Y. to n. Ga. and Ill. Aug., Sept.

9. **S. purpùreum** Tausch. (Garden O., Live-for-ever.) Stems erect, 6 dm. high, stout; leaves oval, obtuse, toothed; cymes compound; *petals purple*, oblong-lanceolate; *follicles abruptly pointed with a short style.* (*S. Telephium* Man. ed. 6, not L.; *S. Fabaria* Koch.) — Rocks and banks, escaped from cultivation in some places. Aug., Sept. (Introd. from Eu.)

10. **S. ròseum** (L.) Scop. (Roseroot.) Stems erect, 1.2–2.5 dm. high; leaves oblong or oval, small; flowers in a close cyme, greenish yellow, or the fertile turning purplish. (*S. Rhodiola* DC.; *Rhodiola rosea* L.) — Greenl. and Lab., along the coast to cliffs of e. Me.; also locally at Chittenango Falls, N. Y. (*House*) and on cliffs of Delaware R., Pa. May, June. (Eu.)

4. SEMPERVÌVUM L. Houseleek

Calyx-lobes, petals, and many-seeded carpels 6–many. Stamens usually twice as numerous. — Succulent perennials with imbricated leaves and cymose-paniculate yellow or purple flowers. (*Semper*, ever, and *vivus*, alive, from the tenacious vitality.)

1. **S. tectòrum** L. (Hen-and-chickens.) Leaves of the dense basal and lateral rosettes (on short thick offsets) ovate, acute, ciliate but otherwise glabrous; those of the stem more oblong, clammy-pubescent; flowers rose-purple. — Often planted, and persisting long after or escaping from cultivation. (Introd. from Eu.)

SAXIFRAGÀCEAE (Saxifrage Family)

Herbs or shrubs, of various aspect, distinguishable from Rosaceae *by having copious albumen in the seeds, opposite as well as alternate leaves, and usually no stipules, the stamens mostly definite, and the carpels commonly fewer than the sepals*, either separate or partly so, or all combined into one compound pistil. Calyx either free or adherent, usually persistent or withering away. Stamens and petals almost always inserted on the calyx. Ovules anatropous.

Tribe I. **SAXIFRÀGEAE.** Herbs. Leaves alternate (rarely opposite in nos. 4, 7, and 8). Fruit dry, capsular or follicular, the styles or tips of the carpels distinct.

* Ovary 2(rarely 3)-celled with axile placentae, or of as many nearly distinct carpels.

1. **Astilbe.** Flowers polygamous, panicled. Stamens (8 or 10) twice as many as the small petals. Seeds few. Leaves decompound.
2. **Sullivantia.** Flowers perfect. Stamens 5. Calyx nearly free. Seeds wing-margined.
3. **Boykinia.** Flowers perfect. Stamens only as many as the petals, which are convolute in the bud and deciduous. Calyx-tube adherent to the ovary. Seed-coat close.
4. **Saxifraga.** Flowers perfect. Petals 5. Stamens 10. Seeds numerous, with a close coat.

* * Ovary 1-celled, with 2 parietal placentae alternate with the stigmas.

5. **Tiarella.** Calyx nearly free from the slender ovary. Petals entire. Stamens 10. Placentae nearly basal.
6. **Heuchera.** Calyx bell-shaped, adherent to the ovary below. Petals small, entire. Stamens 5.
7. **Mitella.** Calyx partly adhering to the depressed ovary. Petals small, pinnatifid. Stamens 10.
8. **Chrysosplenium.** Calyx-tube adherent to the ovary. Petals none. Stamens 10.

* * * Ovary 1-celled, with 3–4 parietal placentae opposite the sessile stigmas; glanduliferous scales alternating with the stamens.

9. **Parnassia.** Sepals, petals, and proper stamens 5. Peduncle scape-like, 1-flowered.

Tribe II. **HYDRÀNGEAE.** Shrubs. Leaves opposite, simple. Ovary 2–5-celled; the calyx adherent at least to its base. Fruit capsular.

* Stamens 20–40.

10. **Philadelphus.** Calyx-lobes conspicuous. Petals 4–5, convolute in the bud. Filaments linear. Styles 3–5.
11. **Decumaria.** Calyx-lobes small. Petals 7–10, valvate in the bud. Filaments subulate. Style 1.

* * Stamens 8 or 10.

12. **Hydrangea.** Calyx-lobes minute in complete flowers. Petals valvate in the bud.

Tribe III. **ESCALLONÌEAE.** Shrubs. Leaves alternate and simple. Ovary 2–5-celled. Fruit capsular.

13. **Itea.** Calyx 5-cleft, free from the 2-celled ovary, which becomes a septicidal capsule.

Tribe IV. **RIBESÌEAE.** Shrubs. Leaves alternate and simple, with stipules adnate to the petiole or wanting. Fruit a berry.

14. **Ribes.** Calyx-tube adnate to the 1-celled ovary. Placentae 2, parietal, many-seeded.

1. ASTÍLBE Hamilton. False Goat's Beard

Flowers dioeciously polygamous. Calyx 4–5-parted, small. Petals 4–5, spatulate, withering-persistent. Ovary almost free, many-ovuled; styles 2, short. Capsule 2-celled, separating into 2 follicles. Seed-coat loose and thin, tapering at each end. — Perennial herbs, with twice or thrice ternately-compound ample leaves, cut-lobed and toothed leaflets, and small white or yellowish flowers in spikes or racemes, which are disposed in a compound panicle. (Name composed of ἀ privative and στίλβη, *sheen*, because the foliage is not shining.)

1. **A. biternàta** (Vent.) Britton. Somewhat pubescent (1–2 m. high); leaflets mostly heart-shaped; petals minute or wanting in the fertile flowers; stamens 10. (*A. decandra* Don.) — Mt. woods, s. e. Ky. (*Kearney*) and s. w Va. to N. C. and Ga. — Closely imitating *Aruncus sylvester*, but coarser.

2. SULLIVÁNTIA T. & G.

Calyx bell-shaped, adhering below only to the base of the ovary, 5-cleft. Petals 5, oblanceolate, entire, acutish, withering-persistent. Stamens shorter than the petals. Capsule 2-beaked, many-seeded, opening between the beaks; seeds imbricated upward. — Low and reclined-spreading perennial herbs with rounded and cut-toothed or slightly lobed smooth leaves on slender petioles, and small white flowers in a branched loosely cymose panicle raised on a nearly leafless slender stem (1.5–4 dm. long). Peduncles and calyx glandular; pedicels recurved in fruit. (Dedicated to the distinguished bryologist *William Starling Sullivant*, who discovered our species.)

1. **S. Sullivántii** (T. & G.) Britton. (*S. ohionis* T. & G.) — Limestone cliffs, O. and Ind. to Ia. and Minn. June.

3. BOYKÍNIA Nutt.

Calyx-tube top-shaped, adherent to the 2-celled and 2-beaked capsule. Stamens 5, as many as the deciduous petals, these mostly convolute in the bud. Otherwise as in *Saxifraga*. — Perennial herbs, with alternate palmately 5–7-lobed or cut petioled leaves, and white flowers in cymes. (Dedicated to the late *Dr. Boykin* of Georgia.)

1. **B. aconitifòlia** Nutt. Stem glandular (2–6 dm. high); leaves deeply 5–7-lobed. (*Therofon* Millspaugh.) — Rocky banks, W. Va. (acc. to Millspaugh) and mts. of Va. to Ga. and Tenn. July.

4. SAXÍFRAGA [Tourn.] L. Saxifrage

Calyx either free from or adhering to the base of the ovary, 5-cleft or parted. Petals entire, imbricated in the bud, commonly deciduous. Styles 2. Capsule 2-beaked, 2-celled, opening down or between the beaks, or sometimes 2 almost separate follicles. — Chiefly perennial herbs, with the root-leaves clustered, those of the stem mostly alternate. (Name from *saxum*, a rock, and *frangere*, to break; many species rooting in the clefts of rocks.)

Acaulescent, the principal leaves in a basal rosette; scapes naked below the inflorescence.
- Flowers mostly replaced by leafy tufts . . . . . 1. *S. stellaris*, v. *comosa*.
- Flowers all perfect.
  - Sepals reflexed.
    - Leaves conspicuously and coarsely dentate.
      - Petals unequal; follicles strongly ribbed . . . . . 2. *S. leucanthemifolia*.
      - Petals uniform; follicles obscurely or not at all ribbed.
        - Leaves abruptly contracted to long petioles . . . . . 3. *S. caroliniana*.
        - Leaves gradually narrowed to the base . . . . . 4. *S. micranthidifolia*.
    - Leaves finely or shallowly crenate-dentate.
      - Leaves membranaceous, pilose beneath . . . . . 5. *S. Forbesii*.
      - Leaves leathery, glabrate beneath . . . . . 6. *S. pennsylvanica*.
  - Sepals ascending.
    - Petals white, exceeding the sepals . . . . . 7. *S. virginiensis*.
    - Petals green, much shorter than the sepals, or wanting (7) *S. virginiensis*, v. *chlorantha*.

Caulescent tufted or matted plants, branching at base, the flowering branches mostly leafy below the inflorescence.
- Leaves with 3–5 lobes or coarse teeth.
  - Leaves (basal) rounded, on slender petioles . . . . . 8. *S. rivularis*.
  - Leaves gradually narrowed to the base, rigid, with 3 sharp teeth . 9. *S. tricuspidata*.
- Leaves entire or with regularly many-toothed or ciliate margins.
  - Leaves linear-lanceolate, entire (sometimes sparingly ciliate), alternate; flowers yellow . . . . . 10. *S. aizoides*.
  - Leaves toothed or ciliate.
    - Leaves mostly in basal rosettes; scapes upright, bearing numerous whitish flowers . . . . . 11. *S. Aizoon*.
    - Leaves crowded and opposite along the matted branches; flowers solitary, purple . . . . . 12. *S. oppositifolia*.

1. S. stellàris L., var. comòsa Willd. Leaves small, spatulate, wedge-shaped, more or less toothed; scape (7–16 cm. high) bearing a contracted panicle; most of the flowers changed into tufts of green leaves; *petals unequal, lanceolate, with a claw.* (*S. comosa* Britton.) — Arctic Am., locally s. to Mt. Katahdin, Me., and mts. of Col. July. (Eurasia.)

2. S. leucanthemifòlia Michx. Leaves spatulate-oblong, coarsely toothed or cut, tapering into a petiole; stems (2–5 dm. high) bearing one or more leaves or leafy bracts and a loose spreading corymbose or paniculate cyme; *petals* white, lanceolate, the 3 *larger ones with a heart-shaped base* and a pair of yellow spots, the 2 smaller with a tapering base and no spots. (*S. Michauxii* Britton.) — Wet cliffs, mts. of Va. to N. C. and Ga.

3. S. caroliniàna Gray. Viscid with glandular hairs; *leaves* oval or elliptica (2–6 cm. broad), coarsely toothed, rather abruptly or somewhat cuneately *contracted to long* hairy *petioles;* stem 3–4 dm. high; panicle ample; petals ovate obtuse, white with two purple spots; filaments clavate; follicles united only at the base, widely spreading (*S. Grayana* Britton.) — Wet limestone rocks, mts. of s. w. Va.

4. S. micranthidifòlia (Haw.) Britton. (Lettuce S.) *Leaves oblong or oblanceolate, obtuse, sharply toothed,* 6–14 cm. in length, tapering into a margined petiole nearly as long; scape slender, 3–9 dm. high; panicle elongated, loosely flowered; pedicels slender; *calyx reflexed, entirely free, nearly as long as the oval obtuse (white) petals; filaments club-shaped; follicles* nearly separate, diverging, *narrow, pointed,* 4–6 mm. long. (*S. erosa* Pursh.) — Cold mt. brooks and wet rocks, Pa. to N. C. and Tenn.

5. S. Forbèsii Vasey. Stem stout, 6–12 dm. high; leaves denticulate, oval to elongated-oblong (1–2 dm. long); sepals oblong; petals pure white, considerably exceeding the calyx-lobes; *filaments filiform; follicles short, ovate.* — Shaded cliffs, near Makanda, s. Ill. (*Forbes*); and (?) e. Mo. (*Lettermann*), where showing some transition to *S. pennsylvanica.*

6. S. pennsylvánica L. (Swamp S.) Large (3–6 dm. high); *leaves oblanceolate, thickish, obscurely toothed* (1–2 dm. long), narrowed at base into a short and broad petiole; cymes in a large oblong panicle, at first clustered; *lobes of* the nearly free *calyx deltoid, about the length of the linear-lanceolate (greenish) small petals; filaments awl-shaped;* follicles at length divergent. — Low meadows, N. E. to Va., w. to Minn. and Mo. — A form with crimson petals occurs in Vt. and N. H. (*Miss E. Robinson, Miss Dearborn*).

7. S. virginiénsis Michx. (Early S.) Low (1–3 dm. high); *leaves obovate or oval-spatulate,* narrowed into a broad petiole, crenate-toothed, thickish; flowers in clustered at length open and loosely panicled cymes; follicles united merely at the base, divergent, purplish. — Exposed rocks and dry hillsides; N. B. and Que. to Ga., and w. to Minn., Mo., and Tenn.; common, especially northw. Apr.–June. Var. chlorántha Oakes is an anomalous plant of Essex Co., Mass., with tiny green pubescent petals or these modified to stamens.

8. S. rivulàris L. (Alpine Brook S.) Small; stems weak, 3–5-flowered; lower *leaves rounded,* 3–5-*lobed,* slender-petioled, upper lanceolate; *petals white, ovate.* — Arctic Am., locally s. to Mt. Washington, N. H.; and in the Rocky Mts. to Mont. June, July. (Eu.)

9. S. tricuspidàta Rottb. Stems tufted (4–16 cm. high), naked above; flowers corymbose; *leaves oblong or spatulate, with 3 rigid sharp teeth* at the summit; *petals obovate-oblong, yellow.* — Rocks, Arctic Am., s. to L. Superior, L. Winnipeg, and mts. of B. C. June–Aug. (Eu.)

10. S. aizoìdes L. (Yellow Mountain S.) Low, matted or ascending; branches 0.5–3 dm. long, with few or several corymbose flowers; *leaves* numerous, *fleshy,* distantly spinulose-ciliate; *petals yellow, spotted with orange, oblong.* (*S. autumnalis* L.) — Wet calcareous rocks, Arctic Am., s. to Gulf of St. Lawrence, mts. of n. Vt., w. N. Y., n. Mich., Alb., and B. C. June–Aug. (Eu.)

11. S. Aizòon Jacq. Scape 1–5 dm. high; *leaves persistent, thick, spatulate, with white cartilaginous toothed margins;* calyx partly adherent; petals obovate, cream-color, often spotted. — Calcareous rocks, Greenl. and Lab. to Sask., locally s. to N. S., N. B., mts. of n. Vt. and L. Superior. June, July. (Eurasia.)

12. **S. oppositifòlia** L. (Mountain S.) *Leaves* (2–4 mm. long) fleshy, *ovate, keeled, ciliate, imbricated* on the sterile branches; *petals purple*, much longer than the 5-cleft calyx. — Calcareous rocks, Arctic Am., s. to Gulf of St. Lawrence, mts. of n. Vt., Mont. and Ida. May, June, rarely Aug. (Eurasia.)

5. TIARÉLLA L. False Miterwort

Calyx bell-shaped, 5-parted. Petals 5, with claws. Stamens long and slender. Styles 2. Capsule membranaceous, 2-valved; the valves unequal. Seeds few, at the base of each parietal placenta, globular, smooth. — Perennials; flowers white. (Name a diminutive from τιάρα, *a tiara*, or turban, from the form of the pistil, which is like that of *Mitella*, to which the name of *Miterwort* properly belongs.)

1. **T. cordifòlia** L. Leaves from the rootstock or summer runners, heart-shaped, sharply lobed and toothed, sparsely hairy above, downy beneath; stem (1–4 dm. high) leafless or rarely with 1 or 2 leaves; raceme simple; petals oblong, often subserrate. — Rich rocky woods, N. S. and N. B. to Minn., Ind., and southw. in the mts. Apr.–June.

6. HEUCHÈRA L. Alum Root

Calyx 5-cleft. Petals 5, spatulate. Styles 2, slender. Capsule 1-celled, with 2 parietal many-seeded placentae, 2-beaked, opening between the beaks. Seeds oval, with a rough and close seed-coat. — Perennials, with the round heart-shaped leaves principally from the rootstock; those on the stems, if any, alternate. Petioles with dilated margins or adherent stipules at their base. Flowers in small clusters borne in a narrow panicle, greenish or purplish. (Named for *J. H. Heucher*, a German botanist of the 17th and 18th centuries.)

Calyx regular or essentially so.
- Calyx in anthesis 1.5–2 mm. long.
  - Leaves with prominent triangular lobes.
    - Lower leaf-surfaces glabrous or merely villous along the nerves . . 1. *H. villosa.*
    - Lower leaf-surfaces villous . . . . . 2. *H. macrorhiza.*
  - Leaves reniform, with obscure rounded lobes . . . . . 3. *H. parviflora.*
- Calyx in anthesis 3–6 mm. long . . . . . 4. *H. americana.*

Calyx oblique, often very irregular.
- Stamens about equaling or slightly exceeding the calyx-lobes.
  - Petioles hairy . . . . . 5. *H. hispida.*
  - Petioles at most granular- or glandular-puberulent . . . . . 6. *H. pubescens.*
- Stamens about twice as long as the calyx-lobes . . . . . 7. *H. hirsuticaulis.*

1. **H. villòsa** Michx. *Rootstock* elongate, 0.5–1 *cm. in diameter; stems slender* (1–3 *mm. in diameter at base*), 2–9 dm. high, more or less villous with rusty hairs, especially below; *leaves* basal, *thin, acutely* 7–9-*lobed*, on slender rusty-villous petioles; *bracts* of the loose panicle *linear;* calyx and pedicels somewhat glandular-hispid; petals spatulate-linear, about as long as the exserted stamens, soon twisted. (*H. crinita* Rydb.) — Shallow soil on rocks, Md. to Ill., s. to Ga. and Tenn. June–Aug.

2. **H. macrorhìza** Small. Similar; *rootstock stout*, woody, 1.5–2 *cm. in diameter; stems stout* (4–8 *mm. in diameter at base*), sometimes leafy, 3–10 dm. high, very densely villous with sordid hairs; basal *leaves thick*, suborbicular, *densely pubescent beneath*, sparingly so above, on stout rusty-villous petioles; *bracts* of the panicle *oblong.* — Limestone cliffs and river-bluffs, Ky. and Tenn.

3. **H. parviflòra** Bartl. Stems slender, 1.2–6 dm. high, *glandular-hirsute* (rarely glabrate), as well as the petioles, etc.; *leaves round-reniform, with* 7–9 *short and broad rounded lobes; flowers very small* (2 *mm. long*); petals linear-spatulate, twice as long as the calyx-lobes; fruit narrow. (*H. Rugelii* Shuttlw.) — Shaded cliffs, Va. to s. Ill., Mo. and Ga.

4. **H. americàna** L. (Common A.) *Stems* (6–9 dm. high), etc., *glandular* and more or less *hirsute with short hairs;* leaves roundish, with short rounded lobes and crenate teeth; *calyx very broad*, 4 *mm. long, the spatulate petals equaling or slightly longer than its lobes.* (*H. lancipetala* Rydb.) — Rocky

woodlands, Ct. to N. C., w. to Minn., e. Kan., and Miss. Var. GLAÚCA (Raf.) Rosendahl. Stems, leaves, etc., glabrous or nearly so, often glaucous. (*H. glauca* Raf.; *H. Curtisii* T. & G. ?) — N. Y. to Tenn. and N. C.

5. **H. híspida** Pursh. Stems 5–12 dm. high, *hispid or hirsute* with long spreading hairs (occasionally almost glabrous), scarcely glandular; panicle very narrow; *calyx 6–8 mm. long;* leaves rounded, slightly 5–9-lobed; *stamens soon exserted, longer than the spatulate petals.* — Mts. of Va. and N. C. to Minn., e. Kan., and northwestw. May, June.

6. **H. pubéscens** Pursh. Stem (3–9 dm. high) and petioles *granular-pubescent or glandular above*, not hairy, below often glabrous; leaves round-reniform, with shallow rounded lobes; calyx 6–8 mm. long; *stamens shorter than or slightly exceeding the lobes of the calyx* and the spatulate petals. (*H. roseola* and *H. longiflora* Rydb.) — Rich woods, in the mts., from Pa. to Ky., and southw. June, July.

7. **H. hirsuticaúlis** (Wheelock) Rydb. Stems (5–7 dm. high) and petioles *hirsute with long whitish hairs;* leaves reniform or suborbicular, with 7–11 shallow rounded crenate-toothed lobes, white-hirsute on the veins beneath; inflorescence hirsute and glandular; *calyx about 5 mm. long;* petals greenish or purplish, usually shorter than the oblong calyx-lobes; *stamens long-exserted.* — Bluffs and rocky banks, s. Mich. and Ind. to Mo. May.

7. MITÉLLA [Tourn.] L. MITERWORT. BISHOP'S CAP

Calyx short, adherent to the base of the ovary, 5-cleft. Petals 5, slender. Stamens 5 or 10, included. Styles 2, very short. Capsule short, 2-beaked, 1-celled, with 2 parietal or rather basal several-seeded placentae 2-valved at the summit. Seeds smooth and shining. — Low and slender perennials, with round heart-shaped alternate slender-petioled leaves on the rootstock or runners, and naked or 2-few-leaved flowering stems. Flowers small, in a simple slender raceme or spike. Fruit soon widely dehiscent. (Diminutive of *mitra*, a cap, alluding to the form of the young pod.)

1. **M. diphýlla** L. *Hairy; leaves heart-shaped, acute*, somewhat 3–5-lobed, toothed, *those on the many-flowered stem* 2, *opposite, nearly sessile*, with interfoliar stipules; flowers white, in a raceme (1.5–2 dm. long); stamens 10. — Rich woods, Que. and N. E. to N. C., w. to Minn., Ia., and Mo. May.

2. **M. prostràta** Michx. Similar, but with the elongate flowering stem bearing prominently angulate-lobed alternate leaves quite to the inflorescence. — L. Champlain (*Michaux*); Gaylordsville, Ct. (*C. K. Averill*). — Very little known and possibly an aberrant plant.

3. **M. nùda** L. Small and slender; *leaves rounded or kidney-form*, deeply and doubly crenate; *stem usually leafless, few-flowered*, very slender (1–1.5 dm. high); flowers greenish; stamens 10. — Deep moist woods, in moss, Lab. to Mackenzie, s. to Ct., Pa., Mich., Minn., and Mont. May–July.

8. CHRYSOSPLÈNIUM [Tourn.] L. GOLDEN SAXIFRAGE

Calyx-lobes 4–5, blunt, yellow within. Stamens 8–10, very short, inserted on a conspicuous disk. Styles 2. Capsule inversely heart-shaped or 2-lobed, flattened, very short, 1-celled, with 2 parietal placentae, 2-valved at the top, many-seeded. — Low and small smooth herbs, with tender succulent leaves, and small solitary or leafy-cymed flowers. (Name compounded of χρυσός, *gold*, and σπλήν, *the spleen;* probably from some reputed medicinal qualities.)

1. **C. americànum** Schwein. Stems slender, *decumbent* and forking; *leaves principally opposite*, roundish or somewhat heart-shaped, obscurely crenate-lobed; *flowers distant*, inconspicuous, *nearly sessile*, greenish, tinged with yellow or purple. — Cold wet places, e. Que. to n. Ga., w. to Minn. and Ia.

2. **C. tetrándrum** Fries. *Stems erect; leaves alternate*, reniform-cordate, doubly crenate or somewhat lobed; *flowers corymbose;* stamens 4 (rarely 5–8). (*C. alternifolium* Man. ed. 6, not L.; *C. iowense* Rydb.) — In wet moss, Decorah, Ia. (*Holway*), to the Rocky Mts. and northw. (Eurasia.)

9. PARNÁSSIA [Tourn.] L. Grass of Parnassus

Sepals 5, imbricated in the bud, slightly united at the base, persistent. Petals 5, spreading, imbricated in the bud; a more or less cleft gland-bearing scale at the base of each. Stamens 5, alternate with the petals, persistent. Ovary 1-celled, with 4 projecting parietal placentae; stigmas 4, sessile. Capsule 4-valved, the valves bearing the placentae on their middle. Seeds very numerous, anatropous. Embryo straight; cotyledons very short. — Perennial smooth herbs, with entire leaves, and solitary flowers on long scape-like stems, which often bear a single sessile leaf. Petals white, with greenish or yellowish veins. (Named from Mount Parnassus.)

Calyx-lobes elongate, herbaceous throughout, ascending in fruit; scales dilated below, 5–∞-cleft about to the middle.
- Leaves gradually tapering at base; petals elliptic-oblong . . . . . 1. *P. parviflora.*
- Leaves cordate; petals ovate . . . . . 2. *P. palustris.*

Calyx-lobes short-oblong, firm, with scarious margins, reflexed in fruit; scales 3-cleft to the base.
- Petals sessile.
  - Scales shorter than or barely equaling the stamens . . . . . 3. *P. caroliniana.*
  - Scales much exceeding the stamens . . . . . 4. *P. grandifolia.*
- Petals abruptly contracted into a claw . . . . . 5. *P. asarifolia.*

1. **P. parviflòra** DC. Scapes 0.5–3 dm. high, slightly angled; leaves ovate or oblong, slender-petioled; petals 5–8 mm. long, slightly exceeding the calyx-lobes; *scales mostly 5–7-cleft;* capsule with thin firm walls. — Meadows, wet rocks, etc., Nfd. to Alaska, s. to Cape Breton I., Mich., Wisc., S. Dak., and Utah. July, Aug.

2. **P. palûstris** L. Scapes subterete, 0.5–4 dm. high; leaves firm, cordate-ovate, slender-petioled; petals 10–13 mm. long, much exceeding the calyx-lobes; *scales mostly 9–15-cleft.* — Lab. to Alaska, locally s. to e. Que., Mich., Minn., N. Dak., and Wyo. July, Aug. (Eurasia.)

3. **P. caroliniàna** Michx. Scapes 1.5–6 dm. high; leaves coriaceous, ovate to orbicular, often subcordate; *petals* ovate-oblong, 10–18 mm. long, many-veined, *twice or thrice exceeding the scales.* — Swamps or wet mostly calcareous rocks, somewhat local. Aug., Sept.

4. **P. grandifòlia** DC. Similar but stouter, with larger leaves and flowers; *gland-tipped cilia filiform, much exceeding the stamens and nearly equaling the petals.* — Mts., Va. to Fla. and Mo. (according to Wheelock). Aug., Sept.

5. **P. asarifòlia** Vent. Scapes angled, 2–5 dm. high; leaves coriaceous, reniform, the basal slender-petioled; petals oblong-elliptic, 10–18 mm. long, many-veined; *scales mostly shorter than the stamens.* — Bogs, wet rocks, etc., mts. from Va. southw. Aug.–Oct.

10. PHILADÉLPHUS L. Mock Orange or Syringa

Calyx-tube top-shaped; the limb 4–5-parted, spreading, persistent, valvate in the bud. Petals rounded or obovate, large. Styles united below or nearly to the top; stigmas oblong or linear. Capsule 3–5-celled, splitting at length into as many pieces. Seeds very numerous, with a loose membranaceous coat prolonged at both ends. — Shrubs, with opposite often toothed leaves, no stipules, and solitary or cymose-clustered showy white flowers. (An ancient name, applied by Linnaeus to this genus for no obvious reason.)

1. **P. inodòrus** L. *Glabrous;* leaves ovate or ovate-oblong, pointed, entire or with some spreading teeth; flowers single or few at the ends of the diverging branches, pure white, scentless; *calyx-lobes acute*, scarcely longer than the tube. — Mts. of Va. to Ga. and Ala.; sometimes established northw.

2. **P. grandiflòrus** Willd. A tall shrub, like the last, but *somewhat pubescent*, with long and recurved branches, *larger flowers*, and the *calyx-lobes long and taper-pointed.* — Along streams, Va. to Fla. — Often cultivated.

P. coronàrius L., the common Mock Orange or Syringa of cultivation, from s. Eu., with racemose cream-colored odorous flowers, sometimes escapes.

11. DECUMÀRIA L.

Flowers all fertile. Calyx-tube turbinate, 7–10-toothed. Petals oblong. Stamens 20–30. Styles united into one, persistent. Stigma thick, 7–10-rayed. Capsule 10–15-ribbed, 7–10-celled, many-seeded, bursting at the sides, the thin partitions at length separating into numerous chaffy scales. — Smooth climbing shrub, with ovate or oblong entire or serrate leaves, no stipules, and numerous fragrant white flowers in compound terminal cymes. (Name said to be derived from *decumanus*, of the tenth part, referring to the often 10-merous flowers.)

1. **D. bárbara** L. Leaves shining, sometimes pubescent; capsule with the persistent style and stigma urn-shaped, pendulous. — Banks of streams, Dismal Swamp, Va., to Fla. and La.

12. HYDRÁNGEA [Gronov.] L.

Calyx-tube hemispherical, 8–10-ribbed, adherent to the ovary; the limb 4–5-toothed. Petals ovate, valvate in the bud. Stamens 8–10, slender. Capsule 15-ribbed, 2-celled below, many-seeded, opening by a hole between the 2–4 diverging styles. — Shrubs, with opposite petioled exstipulate leaves. The marginal flowers of the compound cymes usually sterile and radiant, consisting merely of a showy membranaceous and colored flat and dilated calyx. (Name from ὕδωρ, *water*, and ἀγγεῖον, *a vessel*, from the shape of the capsule.)

1. **H. arboréscens** L. (Wild H.) Glabrous or nearly so, 3–25 dm. high; *leaves* ovate, rarely heart-shaped, pointed, serrate, usually somewhat *paler green* beneath; cymes flat; flowers often all fertile, rarely all radiant. — Rocky banks, s. N. Y. to Fla., w. to Ia. and Mo.

2. **H. cinèrea** Small. Branches cinereous-puberulent; *leaves densely tomentose, much paler beneath.* (*H. radiata* Man. ed. 6, not Walt.) — S. C. and Ga. to Tenn. and Mo.

13. ÍTEA [Gronov.] L.

Calyx 5-cleft, free from the ovary or nearly so. Petals 5, lanceolate, much longer than the calyx, and longer than the 5 stamens. Capsule oblong, 2-grooved, 2-celled, tipped with the 2 united styles, 2-parted (septicidal) when mature, several-seeded. — Shrubs, with simple alternate petioled exstipulate leaves, and small white racemose flowers in simple racemes. (Greek name of the Willow.)

1. **I. virgínica** L. Leaves deciduous, oblong, pointed, minutely errate. — Swamps, chiefly on the coastal plain, N. J. and Pa. to Fla. and Tex.; inland in Miss. basin to Ill. and Mo. May, June.

14. RÌBES L. Currant. Gooseberry

Calyx 5-lobed, often colored; the tube adherent to the ovary. Petals 5, inserted in the throat of the calyx, small. Stamens 5, alternate with the petals. Ovary 1-celled, with two parietal placentae and 2 distinct or united styles. Berry crowned with the shriveled remains of the calyx. — Low sometimes prickly shrubs, with alternate palmately lobed leaves, which are plaited in the bud (except in one species), often fascicled on the branches; the small flowers from the same clusters, or from separate lateral buds. (*Ribes*, the Arabic name.)

* Peduncles 1–4(rarely 5)-flowered, stems mostly bearing spines at the base of the leafstalks or clusters of leaves, and often with scattered bristly prickles. (Our species are indiscriminately called Wild Gooseberry.)

Calyx-lobes decidedly shorter than the tube; berries apt to be prickly.
- Calyx-tube campanulate.
  - Leaves densely soft-pubescent . . . . . 1. *R. Cynosbati.*
  - Leaves only sparingly pilose . . . . . (1) *R. Cynosbati.* v. *glabratum.*
- Calyx-tube narrowly cylindric . . . . . 2. *R. huronense.*

Calyx-lobes as long as or exceeding the tube.
Stamens at length equaling or exceeding the calyx-lobes; berry smooth.
Calyx 9-12 mm. long . . . . . 3. *R. gracile.*
Calyx 5-7 mm. long.
Petioles usually bearing only simple elongate glands; bracts of the raceme mostly rounded at tip . . . . . 4. *R. rotundifolium.*
Petioles bearing mostly compound elongate trichomes; bracts of the raceme mostly pointed.
Principal leaves cuneate to truncate at base.
Mature leaves glabrate or slightly pilose beneath . . . 5. *R. oxyacanthoides.*
Mature leaves densely soft-pubescent . . (5) *R. oxyacanthoides*, v. *calcicola.*
Principal leaves subcordate at base . . . (5) *R. oxyacanthoides*, v. *saxosum*
Stamens distinctly shorter than the calyx-lobes; berry hairy or glandular 6. *R. Grossularia.*

* * Flowers several in elongate racemes. (CURRANTS.)

Calyx campanulate to saucer-shaped.
Leaves sprinkled, at least beneath, with resinous atoms; calyx campanulate; fruit black.
Calyx-tube equaling the lobes.
Bracts shorter than the pedicels . . . . . 8. *R. nigrum.*
Bracts longer than the pedicels . . . . . 7. *R. floridum.*
Calyx open-campanulate, the lobes much exceeding the short tube . 9. *R. hudsonianum.*
Leaves with no resinous atoms (except occasional glands on the pedicels); calyx flattish.
Stems densely covered with prickles; fruit black . . . . . 10. *R. lacustre.*
Stems without prickles; fruit red.
Ovary and berries glandular-bristly . . . . . 11. *R. prostratum.*
Ovary and berries smooth.
Upright shrub; middle lobe of leaf ovate; pedicels without capitate glands; calyx yellowish . . . . . 12. *R. vulgare.*
Decumbent shrub; middle lobe of leaf deltoid; pedicels with capitate glands; calyx purplish . . . . . 13. *R. triste.*
Calyx salver-form, with elongate tube . . . . . 14. *R. aureum.*

1. R. **Cynósbati** L. (PRICKLY G., DOGBERRY.) Infra-axillary *spines slender*, 0.5–1 cm. long; *leaves* round-ovate, rounded or subcordate at base, *soft-pubescent;* racemes loose, 2.5–6 cm. long; stamens and *undivided style* not longer than the *broadly bell-shaped calyx; berries* large, *armed with long prickles* or rarely smooth. — Rocky woods, w. Me. to the mts. of N. C., w. to Man. and Mo. Var. GLABRÀTUM Fernald. Leaves glabrate or only sparingly pilose on the nerves beneath. — O. to N. C.

2. R. **huronénse** Rydb. Said to resemble *R. Cynosbati*, but with shorter racemes, *calyx-tube slender*, and *styles united only below the middle.* — L. Huron.

3. R. **grácile** Michx. (MISSOURI G.) *Spines* often *long* (7–17 mm.), *stout and red; peduncles long and slender; flowers white* or whitish; *filaments* capillary, 1–1.5 cm. *long*, generally connivent or closely parallel, soon *conspicuously longer than the oblong-linear calyx-lobes.* (*R. missouriense* Nutt.) — Ct. to S. Dak. and southw.

4. R. **rotundifòlium** Michx. Spines short (2–5 mm. long); *leaves* rather firm, sparingly pilose beneath, *mostly rounded at base; peduncles short; flowers greenish* or the lobes dull purplish; *filaments* slender, 4–7 *mm. long*, more or less exceeding the *narrowly oblong-spatulate calyx-lobes.* — Rocky banks, w. Mass. and N. Y., s. in the Alleghenies to N. C.

5. R. **oxyacanthoides** L. (SMOOTH G.) Spines 3–8 mm. long; *leaves* thin but leathery, *glabrescent*, the *petioles often with some naked glands among the compound trichomes; peduncles very short;* flowers greenish yellow to dull purplish; stamens usually equaling the *rather broadly oblong mostly glabrous calyx-lobes.* — Nfd. to Pa., w. to N. Dak. and Man. — The common smooth-fruited gooseberry of the North, the whitish prickles and spines often numerous. Var CALCÍCOLA Fernald. *Leaves densely soft-pubescent; calyx pubescent.* — Marly swamps and limestone rocks, e. Que. and n. Mich. Var. SAXÒSUM (Hook.) Coville. Calyx and *subcordate leaves essentially glabrous.* — Nfd., e. Que., Cape Breton I., L. Superior, Rocky Mts.

6. R GROSSULÀRIA L. (EUROPEAN G.) *Spines stout*, 1–1.5 *cm. long*, *peduncles* very short, 1(*rarely* 2)-*flowered; calyx hirsute*, its lobes oblong. (*R. Uva-crispa* L.) — Escaped from cultivation and locally established in Que., N. E., and the Middle States. (Introd. from Eu.)

7. R. **flóridum** L'Hér. (WILD BLACK C.) Leaves slightly heart-shaped.

sharply 3–5-lobed, doubly serrate; *racemes drooping, downy, the elongate bracts persistent; flowers* large, *yellow and whitish; calyx tubular-bell-shaped, smooth,* 8–10 *mm. long.* — Alluvial thickets and rich banks, N. B. to Assina., and southw.

8. R. NIGRUM L. (BLACK C. of gardens.) Similar, but the *pubescent calyx* 5–6 *mm. long, the tube broadly campanulate, greenish purple and dull whitish.* — Cultivated, and occasionally escaping to thickets, etc. (Introd. from. Eu.)

9. R. hudsoniànum Richards. Similar, but the short *racemes upright or spreading, the short bracts caducous;* the *white calyx* 4–5 *mm. long, the tube much shorter than the spreading-ascending lobes.* — Swamps, Hudson Bay to Minn., westw. and northwestw.

10. R. lacústre (Pers.) Poir. (SWAMP BLACK C.) *Young stems clothed with bristly prickles* and with weak thorns; leaves heart-shaped, 3–5-parted, with the *lobes deeply cut; racemes loosely spreading or drooping, the rhachis, pedicels, and ovary glandular-bristly;* calyx broad and flat; stamens and style not longer than the petals; *fruit bristly, purplish black.* — Cold woods and swamps, Nfd. to B. C., s. to n. N. E., Mich., Minn., Col., and n. Cal., and in the mts. to Pa.

11. R. prostràtum L'Hér. (SKUNK C.) Stems reclined; leaves deeply heart-shaped, 5–7-lobed, smooth, the lobes ovate, acute, doubly serrate; *racemes erect,* slender; calyx flattish; *pedicels and red fruit glandular-bristly.* — Damp woods and rocks, Lab. to Athabasca, s. to n. N. E., Mich., Minn., and along the mts. to N. C.

12. R. VULGÀRE Lam. (RED C. of gardens.) *Suberect; leaves* mostly cordate, slightly pubescent beneath or glabrate, the mature blades 3.5–6.5 cm. wide, *broadened upward,* 3–5-lobed, *the lobes mostly short-ovate; racemes borne chiefly among the leafy shoots,* spreading in anthesis, drooping in fruit, 3–5 (becoming 7) cm. long, the rhachis glabrous though often glandular; pedicels mostly glandless; *calyx yellow-green,* its segments oval and abruptly narrowed below the middle; petals narrowly cuneate; disks between the stamens and the slightly cleft style a high narrow ring with round-scalloped margin; fruit plump and juicy. (*R. rubrum* Man. ed. 6, not L.) — Commonly cultivated, and frequently escaping to fence-rows, thickets, and open woods. (Nat. from Eu.)

13. R. tríste Pall. (SWAMP RED C.) *Straggling or reclining,* the branches often rooting freely; *leaves* somewhat heart-shaped, the mature blades 5–10 cm. broad, the *sides nearly parallel, the lobes mostly broad-deltoid,* permanently white-tomentose beneath; *racemes borne on the old wood chiefly below the leafy tufts,* drooping, 3.5–9 cm. long; pedicels mostly glandular; *calyx smoke-color to purplish,* the segments broadly cuneate to subrhombic, as broad as or broader than long; petals broadly cuneate; disk a low broad pentagon; style deeply cleft; fruit mostly small and hard. (*R. rubrum,* var. *subglandulosum* Maxim.) — Cold woods, swamps, and subalpine regions, Nfd. to Alaska, s. to Me. and Vt. (Asia.) Var. ALBINÉRVIUM (Michx.) Fernald. Leaves glabrous or glabrate beneath. — More common, extending s. to N. S., N. H., Vt., Mich., Wisc., etc.

14. R. aúreum Pursh. (MISSOURI OR BUFFALO C.) Tall spineless shrub; *leaves* 3–5-lobed, rarely at all cordate, *convolute in bud;* racemes short; *flowers golden-yellow, spicy-fragrant; tube of salver-form calyx* 3–4 *times longer than the* oval *lobes;* stamens short; berries yellow or black. — Banks of streams, Minn. to Mo., Ark., and westw.; also common in cultivation.

HAMAMELIDÀCEAE (WITCH-HAZEL FAMILY)

Shrubs or trees, with alternate simple leaves and deciduous stipules; flowers in heads or spikes, often polygamous or monoecious; the calyx adhering to the base of the ovary, which consists of 2 pistils united below, and forms a 2-beaked 2-celled woody capsule, opening at the summit, with a single bony seed in each cell, or several, only one or two of them ripening. — Petals inserted on the calyx, narrow, valvate or involute in the bud, or often none at all. Stamens twice as many as the petals, and half of them sterile and changed into scales, or

numerous. Seeds anatropous. Embryo large and straight, in scanty albumen; cotyledons broad and flat.

* Flowers with a manifest calyx, or calyx and corolla, and a single ovule suspended from the summit of each cell.

1. **Hamamelis.** Petals 4, strap-shaped. Stamens and scales each 4, short.
2. **Fothergilla.** Petals none. Stamens about 24, long; filaments thickened upward.

** Flowers naked, with mere rudiments of a calyx and no corolla, crowded into catkin-like heads; ovules several or many in each cell.

3. **Liquidambar.** Monoecious or polygamous. Stamens very numerous. Capsules consolidated by their bases into a dense head.

1. HAMAMÈLIS L. Witch-hazel

Flowers in little axillary clusters or heads, usually surrounded by a scale-like 3-leaved involucre. Calyx 4-parted, and with 2 or 3 bractlets at its base. Petals 4, strap-shaped, long and narrow, spirally involute in the bud. Stamens 8, very short; the 4 alternate with the petals anther-bearing, the others imperfect and scale-like. Styles 2, short. Capsule opening loculicidally from the top; the outer coat separating from the inner, which incloses the single large and bony seed in each cell, but soon bursts elastically into two pieces. — Tall shrubs or small trees, with straight-veined leaves, and yellow perfect or polygamous flowers. (Ancient Greek name applied to the Medlar, or some similar tree.)

1. **H. virginiàna** L. Leaves obovate or oval, wavy-toothed, somewhat downy when young; blossoming late in autumn, when the leaves are falling, and maturing its seeds the next summer. — Damp woods, N. S. to Fla., w. to e. Minn. and "Tex."

2. FOTHERGÍLLA Murr.

Flowers in a terminal catkin-like spike, mostly perfect. Calyx bell-shaped, the summit truncate, slightly 5–7-toothed. Petals none. Stamens about 24, borne on the margin of the calyx in one row, all alike; filaments very long, thickened at the top (white). Styles 2, slender. Capsule adhering to the base of the calyx, 2-lobed, 2-celled, with a single bony seed in each cell. — A low shrub; the oval or obovate leaves smooth, or hoary underneath, toothed at the summit; the flowers appearing rather before the leaves, each partly covered by a scale-like bract. (Dedicated to the distinguished *Dr. John Fothergill.*)

1. **F. Gardèni** Murr. (*F. carolina* Britton.) — Low grounds, Va. to Ga. Apr., May.

3. LIQUIDÁMBAR L. Sweet Gum Tree

Flowers usually monoecious, in globular heads or catkins; the sterile arranged in a conical cluster, naked; stamens very numerous, intermixed with minute scales; filaments short. Fertile flowers consisting of many 2-celled 2-beaked ovaries, subtended by minute scales in place of a calyx, all more or less cohering together and hardening in fruit, forming a spherical catkin or head; the capsules opening between the 2 awl-shaped beaks. Styles 2, stigmatic down the inner side. Ovules many, but only one or two perfecting. Seeds with a wing-angled seed-coat. — Catkins racemed, nodding, in the bud inclosed by a 4-leaved deciduous involucre. (A mongrel name, from *liquidus*, fluid, and the Arabic *ambar*, amber; in allusion to the fragrant terebinthine juice which exudes from the tree.)

1. **L. Styracíflua** L. (Sweet Gum, Bilsted.) Leaves rounded, deeply 5–7-lobed, smooth and shining, glandular-serrate, the lobes pointed. — Swampy woods, near the coast, s. Ct. to Fla. and Tex.; inland in Miss. basin to Mo. and Ill. Apr., May. (Mex., Centr. Am.) — A large and beautiful tree, with fine-grained wood, the gray bark commonly with corky ridges on the branchlets. Leaves fragrant when bruised, turning deep crimson in autumn. The woody pods filled mostly with abortive seeds, which resemble sawdust.

PLATANÀCEAE (Plane Tree Family)

Trees, with watery juice, alternate palmately-lobed leaves, sheathing stipules, and monoecious flowers in separate and naked spherical heads, destitute of calyx or corolla; the fruit merely club-shaped 1-seeded nutlets, furnished with a ring of bristly hairs about the base. Only the following genus (of uncertain relationship).

1. PLÁTANUS [Tourn.] L. Sycamore. Buttonwood

Sterile flowers of numerous stamens, with club-shaped little scales intermixed; filaments very short. Fertile flowers in separate catkins, consisting of inversely pyramidal ovaries mixed with little scales. Style rather lateral, awl-shaped or thread-like, simple. Nutlets coriaceous, small, tawny-hairy below, containing a single orthotropous pendulous seed. Embryo in the axis of thin albumen. — Large trees, with the bark deciduous in broad thin brittle plates; dilated base of the petiole inclosing the bud of the next season. (The ancient name, from πλατύς, *broad.*)

1. P. occidentàlis L. Leaves mostly truncate at base, angularly sinuate-lobed or toothed, the short lobes sharp-pointed; fertile heads solitary, hanging on a long peduncle. — Rich soil, s. Me. to n. Vt., Ont., s. e. Minn., e. Kan., and southw. — Our largest tree, often 25–40 m. high, with a trunk 2–4.2 m. in diameter.

ROSÀCEAE (Rose Family)

Plants with regular flowers, numerous (rarely few) distinct stamens inserted on the calyx, and 1–many pistils, which are quite distinct, or (in the second tribe) united and combined with the calyx-tube. Ovules (anatropous) 1–few in each ovary; seeds almost always without albumen. Embryo straight, with large and thick cotyledons. Leaves alternate, with stipules, these sometimes caducous, rarely obsolete or wanting. — Calyx of 5 (3–8) sepals (the odd one superior), united at the base, often appearing double by a row of bractlets outside. Petals as many as the sepals (rarely wanting), mostly imbricated in the bud, and inserted with the stamens on the edge of a disk that lines the calyx-tube. Trees, shrubs, or herbs.

Tribe I. SPIRAÈEAE. Ovary superior and not inclosed in a calyx-like tube; carpels 1–12, dry at maturity and (in ours) debiscent, 2–several(rarely 1)-seeded.

* Carpels inflated; leaves simple, often palmately lobed.

1. **Physocarpus.** Stamens ∞, in several rows. Carpels 2–5, splitting into 2 valves. Seeds with hard shining coat. Shrubs.

* * Carpels not inflated.

+ Carpels alternate with (or of a different number from) the sepals or calyx-lobes.

2. **Spiraea.** Stamens on the margin of a disk-like expansion of the floral axis. Carpels splitting chiefly along the ventral suture. Leaves simple. Shrubs.
3. **Aruncus.** Dioecious. Stamens borne on the upper (inner) surface of a disk-like expansion of the floral axis. Leaves compound. Herbs.

+ + Carpels (normally 5) opposite the 5 sepals or calyx-lobes.

4. **Sorbaria.** Petals imbricated in bud. Seeds pendulous. Flowers small, corymbose.
5. **Gillenia.** Petals convolute in bud. Seeds ascending. Flowers long-peduncled.

Tribe II. PÒMEAE. Carpels few, mostly definite (2–5) and usually connate, borne within and adnate to a cup-like or urn-like depression in the enlarged summit of the floral axis (resembling a calyx-tube), the whole united to form a fleshy fruit. Trees and shrubs, with stipules free from the petiole.

* Mature carpels papery or soft-cartilaginous.

+ Cells of the compound ovary as many as the styles, without false or partial partitions.

6. **Pyrus.** Fruit depressed-globose to ellipsoidal or obovoid; its carpels enveloped in the fleshy receptacle, papery or soft-cartilaginous, usually 2-ovuled and 2-seeded. Leaves simple or compound.

+ + Cells of the compound ovary subdivided by partial partitions projecting inward from the back.

7. **Amelanchier.** Carpels usually 5. Leaves simple. Unarmed.

* * Mature carpels very hard and bony, distinct or firmly coherent in the fleshy fruit.

8. **Crataegus.** Ovules in each cell either solitary or if 2 unequal, one sessile and fertile, the other stalked and sterile. Shrubs and small trees, usually armed. Leaves simple, mostly serrate or dentate, thin or coriaceous.

9. **Cotoneaster.** Ovules 2 in each cell, equal. Armed shrub with coriaceous oval crenulate evergreen leaves.

Tribe III. POTENTÍLLEAE. Carpels few-many, 1(-2)-ovuled, becoming dry achenes, not inclosed at maturity. Chiefly herbs.

* Styles not elongated after anthesis, mostly deciduous.

+ Receptacle pulpy and much enlarged in fruit.

10. **Fragaria.** Petals white. Leaves 3-foliate. Bractlets alternating with the calyx-lobes. Receptacle juicy.

11. **Duchesnea.** Petals yellow. Receptacle spongy, not juicy.

+ + Receptacle dry or nearly so, not greatly enlarged in fruit.

++ Stamens 5.

12. **Sibbaldia.** Stamens alternate with the petals. Leaflets mostly 3-toothed at the end.

13. **Chamaerhodos.** Stamens opposite the petals. Leaflets cleft into linear segments.

++ ++ Stamens numerous.

= Carpels 1-ovuled.

14. **Waldsteinia.** Achenes few, 2–6, rarely 10.

15. **Potentilla.** Achenes numerous. Petals 5 (rarely 4), conspicuous. Calyx-lobes as many, with an alternating set of bractlets.

= = Carpels 2-ovuled.

16. **Filipendula.** Leaves pinnate; stipules kidney-formed.

* * Styles persistent and elongating after anthesis, often plumose or jointed.

17. **Geum.** Calyx-lobes usually with 5 alternating small bractlets. Stamens and carpels numerous; styles becoming plumose or hairy tails, or naked and straight or jointed.

Tribe IV. RÙBEAE. Pistils several or numerous, becoming drupelets in fruit. Ovules 2 and pendulous, but seed solitary. Perennials, herbaceous or with biennial soft-woody stems.

18. **Rubus.** Pistils mostly numerous, fleshy in fruit, crowded upon a spongy receptacle.

19. **Dalibarda.** Pistils 5–10, in the bottom of the calyx, nearly dry in fruit.

Tribe V. POTERÌEAE. Pistils 1–4, becoming achenes, completely inclosed in the dry and firm calyx-tube, which is constricted or nearly closed at the throat. Herbs with compound or lobed leaves. Petals often none.

20. **Alchemilla.** Calyx urceolate, bracteolate. Petals none. Stamens 1–4. Flowers minute, clustered.

21. **Agrimonia.** Calyx top-shaped or bell-shaped, with a margin of hooked prickles. Stamens 5–12. Flowers yellow, in long racemes.

22. **Sanguisorba.** Calyx-lobes petaloid; tube 4-angled, naked. Petals none. Flowers densely capitate or spicate.

Tribe VI. RÒSEAE. Pistils many, becoming bony achenes, inclosed in the globose or urn-shaped fleshy calyx-tube, which resembles a pome. Petals conspicuous. Stamens numerous.

23. **Rosa.** The only genus. Prickly shrubs with pinnate leaves.

Tribe VII. PRÙNEAE. Ovary superior and not inclosed in the calyx-tube at maturity. Calyx deciduous, without bractlets. Pistil solitary, becoming a stone-fruit. Ovules 2, but seed almost always solitary. Style terminal. Trees or shrubs, with simple mostly serrate leaves.

24. **Prunus.** Flowers perfect. Petals and calyx-lobes 5. Stone of the drupe bony.

1. PHYSOCÁRPUS Maxim. Nine-bark

Carpels 1–5, inflated, 2-valved; ovules 2–4. Seeds roundish, with a smooth and shining crustaceous testa and copious albumen. Stamens 30–40. Otherwise as *Spiraea*. — Shrubs, with simple palmately lobed leaves and umbel-like corymbs of white flowers. (Name from *φῦσα, a pair of bellows*, and *καρπός, fruit*.)

1. **P. opulifòlius** (L.) Maxim. Shrub, 1–3 m. high, with long branches, the old bark loose and separating in numerous thin layers; leaves roundish, somewhat 3-lobed and heart-shaped; the purplish membranaceous pods usually 3, essentially glabrate, very conspicuous. (*Spiraea* L.; *Opulaster* Ktze.) — Rocky banks of streams, Que. and N. E. to Fla., w. to Ill. — Often cultivated.

Var. **intermédius** (Rydb.) Robinson. Pods permanently pubescent. (*Opulaster intermedius* Rydb.) — Similar situations, s. Mich. to S. Dak., Ark., and Ala.

2. SPIRAÈA [Tourn.] L.

Calyx 5-cleft, short, persistent. Petals 5, obovate, equal, imbricated in the bud. Stamens 10–50. Pods (follicles) 5–8, not inflated, few-several-seeded. Seeds linear, with a thin or loose coat and no albumen. — Shrubs, with simple leaves, and white or rose-colored flowers in corymbs or panicles. (The Greek name, from *σπειρᾶν, to twist*, from the twisting of the pods in some of the original species.)

Flowers in compound corymbs.	
Calyx-tube top-shaped, pubescent	1. *S. japonica.*
Calyx-tube bell-shaped, smoothish.	
Leaves 2.5–5 cm. broad	2. *S. corymbosa.*
Leaves 1–1.6 cm. broad	3. *S. virginiana.*
Flowers racemosely or spicately panicled.	
Leaves smoothish, scarcely paler beneath.	
Pedicels fascicled, 1.5 cm. long; flowers usually double	4. *S. prunifolia.*
Flowers densely racemo-paniculate; pedicels 2–6 mm. long.	
Inflorescence tomentulose	5. *S. salicifolia.*
Inflorescence subglabrous or sparingly villous	6. *S. latifolia.*
Leaves green above, densely tomentose and white or tawny beneath	7. *S. tomentosa.*

1. **S. japónica** L. f. Stems 1 m. or more high; leaves 7–9 cm. long, glaucous beneath; *petals pink to deep rose-color.* — Frequent in cultivation, and occasionally escaping, s. Ct. (*Graves*) and e. Pa. (Introd. from Asia.)

2. **S. corymbòsa** Raf. Stems erect, dark purple, simple or nearly so; leaves oval or broadly oblong, smoothish, of firm texture, toothed from near the middle to the rounded or obtuse apex, 2.5–5 cm. broad; *flowers white;* corymbs 4–10 cm. broad. (*S. betulifolia*, var. Wats.) — In the Allegheny Mts., N. J. (according to Britton) to W. Va. and Ga.

3. **S. virginiàna** Britton. *Glabrous*, much-branched; leaves lance-oblong, 1–1.6 cm. broad, often acute or acutish at the base; flowers white, about 6 mm. broad; pedicels and calyx glaucous. — On rocks, W. Va. (*Millspaugh*) to N. C. and Tenn. — Not seen; description compiled.

4. **S. prunifòlia** Sieb. & Zucc. *Finely pubescent;* leaves ovate-oblong, obtuse, cuneate at the base, serrulate; flowers white, often double, 1 cm. in diameter. — Persisting after cultivation, and tending to escape to roadsides, e. Mass. and Ct. (Introd. from Japan.)

5. **S. salicifòlia** L. (Meadow-sweet.) Erect shrub, 3–12 dm. high, with tough *yellowish-brown stems; leaves finely serrate*, lance-oblong, 5–7 cm. long, 1–1.8 cm. broad, rather firm in texture; inflorescence thyrsoid, tomentulose; flowers 6–8 mm. in diameter; petals suborbicular, white. — Chiefly in low ground, N. Y. to N. C., Mo., and northwestw. (Asia.)

6. **S. latifòlia** Borkh. (Meadow-sweet.) *Stems red or purplish-brown; leaves* thin, more *coarsely serrate*, mostly 1.5–4 cm. broad; inflorescence smoothish; petals white or pink. — The common Meadow-sweet in e. N. A.; in rocky pastures, etc., Nfd. to Va.

7. **S. tomentòsa** L. (Hardhack, Steeple Bush.) *Stems and lower sur-*

face of the ovate or oblong serrate *leaves very woolly;* flowers in short racemes crowded in a dense panicle, rose-color, rarely white; pods woolly. — Low grounds, N. B. and N. S. to the mts. of Ga., w. to Minn. and Kan.

3. ARÚNCUS [L.] Adans. Goat's Beard

Dioecious. Carpels 3–4, splitting at the ventral suture. Flowers sessile or nearly so on the long spike-like branches of a large open panicle, the fertile flowers reflexed in fruit. Petals small, narrow, white. — Tall, essentially herbaceous. Leaves 2–3-pinnate, the leaflets rather large, ovate-oblong. (*Aruncus*, a word used by Pliny to designate the beard of a goat.)

1. A. sylvéster Kosteletzsky. Stem erect, subsimple, bearing a few large compound petiolate leaves and a large pyramidal spicate panicle; leaflets 6–14 cm. long, green on both sides, sharply and somewhat doubly serrate, acuminate, the base mostly abrupt or subcordate, petiolulate. (*Spiraea Aruncus* L.; *Aruncus Aruncus* Karst.) — Rich soil, wooded ravines, etc., N. Y. to Ga., I. T., and Alaska. (Eurasia.)

4. SORBÀRIA A. Br.

Flowers perfect, paniculate. Carpels mostly 5, opposite the calyx-lobes. Leaves regularly odd-pinnate, the leaflets lance-oblong, sessile, sharply serrate. (Name from *Sorbus*, the Mountain Ash, from the similar foliage.)

1. S. sorbifòlia (L.) A. Br. Suffruticose or nearly herbaceous, erect; leaves 1–4 dm. long, 13–21-foliolate; leaflets caudate-acuminate, with many straightish mostly simple veins springing from the midnerve; panicle ample, pyramidal, terminal; petals white. (*Spiraea* L.) — Common in cultivation, and escaping to waste land and copses. (Asia.)

5. GILLÈNIA Moench. Indian Physic

Calyx narrow, somewhat constricted at the throat, 5-toothed; teeth erect. Petals 5, rather unequal, linear-lanceolate, inserted in the throat of the calyx, convolute in the bud. Stamens 10–20, included. Pods 5, included, at first lightly cohering with each other, 2–4-seeded. — Perennial herbs, with almost sessile 3-foliolate leaves; the thin leaflets doubly serrate and incised. Flowers loosely paniculate-corymbed, pale rose-color or white. (Dedicated to an obscure German botanist or physician, *A. Gille*, or *Gillenius*.) Porteranthus Britton.

1. G. trifoliàta (L.) Moench. (Bowman's Root.) Leaflets ovate-oblong, pointed, cut-serrate; *stipules small, awl-shaped*, entire or slightly incised. — Rich woods, N. Y. to Ga., Mo., and Mich.

2. G. stipulàta (Muhl.) Trel. (American Ipecac.) Leaflets lanceolate, deeply incised; *stipules large and leaf-like*, doubly incised. (*G. stipulacea* Nutt.; *Porteranthus stipulatus* Britton.) — Moist rich woods, w. N. Y. to Kan., La., and Ala.

6. PÝRUS [Tourn.] L.

Calyx-like receptacle urn-shaped, bearing 5 sepals. Petals roundish or obovate. Stamens numerous. Styles 2–5. Fruit a large fleshy pome, or smaller and berry-like, the 2–5 cells imbedded in the flesh, papery or cartilaginous, mostly 2-seeded. — Trees or shrubs, with showy flowers in corymbed or umbel-like cymes. (The classical name of the Pear-tree.) A large genus, often subdivided, but with sections less strongly or constantly marked than our few species would suggest.

§ 1. PIRÓPHORUM Focke. (Pear.) *Leaves simple; orifice of concave receptacle partially or almost completely closed by a disk-like cushion; flesh of large obovoid fruit copious, containing sclerotic (gritty) cells.*

1. P. communis L. The common Pear of cultivation. — Stray seedlings with degenerate fruit occasionally found in copses or woods near orchards. (Introd. from Eu.)

§ 2. MÀLUS (Hill) S. F. Gray. (APPLE.) *Leaves simple; orifice of concave receptacle open; flesh of large subglobular fruit copious, free from sclerotic cells.* MALUS [Tourn.] Hill.

* *Leaves and usually the outer surface of the calyx-lobes glabrate.*
← *Calyx-lobes deciduous in fruit.*

2. **P.** BACCÀTA L. (SIBERIAN CRAB.) Small tree; *leaves ovate-oblong*, serrate but *not lobed*, acuminate, at length subcoriaceous; petals narrowly oblong, with cuneate-attenuate base; pedicels slender, fascicled; pome 2–3 cm. in diameter, usually yellow with reddish cheek. (*Malus* Borkh.) — Common in cultivation, and locally established as an escape in borders of woods, etc., Me., Ct., and doubtless elsewhere. (Introd. from Eurasia.)

× **P.** PRUNIFÒLIA Willd. A highly variable group of hybrids between *P. baccata* and *P. Malus*, combining in differing degrees the characteristics of the two parents. — Cultivated as CRAB APPLES, and not rarely spontaneous by roadsides, in open woods, etc. (Introd. from Eu.)

3. **P. angustifòlia** Ait. Small tree; branchlets often hardened and spine-like; *leaves elliptic-oblong to lance-oblong*, serrate-dentate to nearly entire, those of the sterile shoots *often* shallowly and somewhat *pinnately lobed*, the midnerve commonly glandular above; flowers in 3–7-flowered umbel-like corymbs; petals oblong to obovate, contracted at the base to a cuneate claw; pome greenish-yellow, hard and sour, 2–2.6 cm. in diameter, depressed-globose. (*Malus* Michx.) — River thickets, etc., N. J. to Ill., "Kan.," and southw.

← ← *Calyx-lobes persistent in fruit.*

4. **P. coronària** L. (AMERICAN CRAB.) Tree, somewhat armed, 6–10 m. high; leaves ovate or elliptic, usually rounded or even cordate at the base; those of the sterile shoots somewhat triangular-ovate and lobed, sharply serrate; petals broadly obovate, white or nearly so; fruit much as in the preceding. (*Malus* Mill.) — Thickets and open woods, N. J. to Ont., Kan., and southw.

** *Leaves at least on the lower surface and outer surface of the calyx-lobes clothed with a persistent white or gray tomentum.*

5. **P. ioénsis** (Wood) Bailey. Similar in habit to the two preceding; *leaves* chiefly oblong or ovate-oblong, glabrate, dull green, and somewhat rugose above, very pale and densely tomentose beneath, doubly serrate or pinnately several-lobed, usually *narrowed at the base;* petioles woolly; flowers mostly 2–3 in a corymb; the *pedicels slender*, tomentose, becoming 2.5–3.5 *cm. long* in fruit; calyx-lobes persistent. (*Pyrus coronaria*, var. Wood; *Malus* Britton.) — Ill. and Wisc. to Minn., Kan., and Okla.

× **P. Soulárdi** Bailey. A hybrid between *P. ioensis* and *P. Malus*, and of intermediate character, is said to occur in a wild state from Minn. to Tex. It may be distinguished from *P. ioensis* by its shorter thicker pedicels, usually about 2 cm. long, and somewhat larger fruit.

6. **P.** MÀLUS L. (APPLE.) *Leaves* ovate-oblong, *rounded or cordate at the base*, sub-equally serrate; *pedicels stout*, woolly, 2–2.8 *cm. long;* fruit 4 cm. or more in diameter. (*Malus* Britton.) — The commonest fruit tree of cultivation, often escaping to woods. (Introd. from Eu.)

§ 3. ADENÓRHACHIS DC. (CHOKEBERRY.) *Leaves simple, the midrib glandular along the upper side; cymes compound; styles united at base, fruit small, berry-like.* ARONIA Medic.

7. **P. arbutifòlia** (L.) L. f. Shrub, 1–2.6 m. high; *leaves* oblong-oblanceolate, mostly acute or acuminate, finely glandular-serrate, green and glabrous or glabrate above, paler and *permanently canescent-tomentose below; pedicels, calyx*, and young fruit *canescent-tomentose;* petals white or reddish; ripe *fruit red*, about 7 mm. in diameter; cymes numerously (mostly 9–18-) fruited. *Aronia* Ell.) — Swamps and low woods, N. Y. to O., Ark., and Fla. — Appearing to pass without sharp distinction into

Var. **atropurpùrea** (Britton) Robinson. Cymes less numerously (mostly

3–10-) fruited; *fruit* larger, 8–10 mm. in diameter, *claret-colored to purplish-black.* (*Aronia* Britton.) — Similar habitats, centr. Me., southw. and westw.; common.

8. **P. melanocárpa** (Michx.) Willd. Shrub, similar in habit, generally of lower stature; *leaves* varying from rather broadly oblong and acuminate to spatulate-oblanceolate and scarcely pointed, *glabrous or early glabrate beneath* as well as above; *pedicels and calyx* also nearly or quite *smooth; fruit very dark purple* or essentially black. (*Aronia nigra* Britton.) — Moist woods, but also rocky uplands; common northw. and extending southw. in the Alleghenies at least to N. C.

The members of this section occasionally form natural hybrids with those of § 4. These may be recognized usually by their imperfectly pinnate or pinnatifid leaves.

§ 4. SÓRBUS (L.) S. F. Gray. (Mountain Ash.) *Leaves odd-pinnate, with rather numerous leaflets; cymes compound; styles distinct; pome berry-like, small. Trees or tall shrubs.* Sorbus [Tourn.] L.

9. **P. americàna** (Marsh.) DC. (American M.) *Nearly glabrous* or soon becoming so; *leaflets* 13–15, *lanceolate, taper-pointed,* sharply serrate with pointed teeth, bright green; cymes large and flat; berries globose, bright red, not larger than peas. (*Sorbus* Marsh.) — Woods, Lab. to Man., s. to n. and w. N. E., N. Y., the Great L. region, and in the mts. to N. C.; common.

10. **P. sitchénsis** (Roem.) Piper. *Nearly glabrous; leaflets oblong,* oval, or lance-ovate, *mostly obtuse* or abruptly pointed, serrate (often doubly) with more spreading teeth, rather pale beneath, of firmer texture than in the preceding; flowers (earlier) somewhat larger (8–11 mm. broad); fruit 8–10 mm. in diameter. (*P. sambucifolia* Man. ed. 6, not C. & S.; *Sorbus* Roem.) — River-banks and damp rocky uplands, Lab. to centr. Me., westw. and northwestw. to the Pacific.

11. **P. Aucupària** (L.) Ehrh. (European M., Rowan Tree.) *Leaflets* narrowly oblong, mostly obtuse, rather pale beneath, always more or less *pubescent* or tomentose at least *on the lower surface.* (*Sorbus* L.) — Extensively cultivated for ornament, and now tending to become naturalized. (Introd. from Eu.)

7. AMELÁNCHIER Medic. Juneberry

Calyx 5-cleft. Petals obovate to oblong, rarely linear. Stamens numerous, short. Styles 5, united below. Ovary 5-celled, each cell 2-ovuled, but with a projection growing from the back of each and forming a false cartilaginous partition, the sweet and edible berry-like pome thus 10-celled, with one seed in each cell (when all ripen). — Small trees or shrubs, with simple leaves, and white racemose flowers. (Name said to be barbaric, the derivation not satisfactorily explained.)

Petals narrowly oblong, 14–25 mm. in length; early flowering; leaves finely and sharply serrate . . . . . 1. *A. canadensis.*
Petals oblong to obovate, 4–12 mm. in length.
  Flowers racemed; racemes normally 5–∞-flowered; leaves (at first folded lengthwise) mostly obtuse, sometimes even cordate at base.
    Flowering early (mostly 1 Apr.–15 May, fruit ripe June–July); leaves oblong or suborbicular-oblong, finely serrate . . . . . 2. *A. oblongifolia.*
    Flowering later (mostly 15 May–25 June, fruit ripe Aug.–Sept.); leaves suborbicular-oblong, coarsely dentate . . . . . 3. *A. spicata.*
  Flowers solitary or 2–4 in terminal fascicles; leaves (flat even in very early stages) acutish or subcuneate at base . . . . . 4. *A. oligocarpa.*

1. **A. canadénsis** (L.) Medic. (Shad Bush, Service Berry.) Tree or shrub, 3–12 m. high, *nearly or soon glabrous;* leaves (when young folded lengthwise and brownish-purple) ovate to ovate-oblong, usually somewhat cordate at base, pointed, *finely and sharply serrate,* 4–9 cm. long, 3–6 cm. wide; bracts and stipules very long-silky-ciliate; flowers large, in drooping racemes;

fruit on elongated pedicels, globose, crimson or purplish. — Dry open woodlands, common. — Dwarf forms with somewhat smaller flowers are found in sterile rocky ground.

Var. **Botryàpium** (L. f.) T. & G. *Leaves* densely tomentose when young, *retaining a sparing soft pubescence even in age* or tardily glabrate; in other respects like the typical form. — Open ground and wooded hillsides, s. Me. to n. N. H., Mich., and southw.

2. **A. oblongifòlia** (T. & G.) Roem. Shrub or small tree, 2–6 m. high; the young leaves and racemes densely white-tomentose; *leaves oblong*, usually rounded at each end or mucronate, *finely and evenly serrate*, at length glabrate, usually pale-green especially beneath, 4–6 cm. long, 1.5–2.8 cm. broad; flowers numerous, smaller, in rather dense racemes; *petals obovate* or short-oblong; fruit similar, but more juicy and on shorter pedicels. (*A. canadensis*, var. T. & G.) — Moist woods and rocky uplands, N. B. to Va., Mo., and Minn. — Highly variable, passing into forms with broader elliptical or ovate-lanceolate acutish leaves of deeper green color (being the *A. spicata* of many auth., not C. Koch). Apparently intergrades with other species. Noteworthy is

Var. **micropétala** Robinson. Dwarf, 3–9 dm. high; *petals* 4–7 mm. long, *spatulate-oblong* to narrowly obovate. — Exposed ledges of rocky hills or dry sandy soil, e. Mass. to Ct., near the coast.

3. **A. spicàta** (Lam.) C. Koch. Shrub, 1–3 m. high; *leaves* at first covered especially beneath with dense pale yellow tomentum (tardily deciduous as flocculent wool), *oval or suborbicular*, 3–8 cm. long, 2.3–5.5 cm. wide, *coarsely dentate* toward the end or more often nearly to the base; veins stronger, straighter, and more numerous than in the other species; fruit dark purple, autumnal. (*Mespilus canadensis*, var. *rotundifolia* Michx.; *A. rotundifolia* Roem.; *A. alnifolia* of some auth., not Nutt.) — Banks of streams, e. Que. to centr. Me., and westw. about the Great Lakes; s. on mts. to w. Mass. (*Hoffmann*).

4. **A. oligocárpa** (Michx.) Roem. Shrub, 1–3 m. high, early glabrate or nearly so; *leaves* thin, *oblong or oval, finely serrate*, 3–5 cm. long, usually acute at the base; flowers few, solitary and terminal or in terminal fascicle-like racemes of 2–4; *petals oblong-obovate*; fruit often broadly pyriform, at length usually subglobose, dark purple, with dense bloom. (*A. arguta* Nutt.) — Cold swamps and mt. woods, Lab. to n. N. E., and westw. to L. Superior.

8. CRATAÈGUS L. Hawthorn. White Thorn

Revised by W. W. Eggleston

Calyx-tube cup-shaped or campanulate, adnate to the carpels, the limb 5-cleft. Petals 5, white (rarely pink), roundish, inserted on the margin of the disk in the throat of the calyx. Stamens 5–25, inserted in 1–3 rows; filaments filiform; anthers oblong, white, yellow, or red. Ovary inferior or its summit free; carpels 1–5; styles 1–5, distinct, persistent, usually surrounded at base by tomentum; stigmas terminal. Pome small, yellow, red, more rarely blue or black; containing 1–5 bony nutlets, each usually 1-seeded. Seed erect, the testa membranaceous. — Thorny shrubs or small trees, with simple usually lobed leaves (those on vigorous vegetative shoots often of different shape and more deeply cut); stipules linear-lanceolate, very deciduous (those on vegetative shoots much wider and often persistent). Flowers in corymbs. (Name from κράτος, *strength*, because of the hardness and toughness of the wood.) A genus of exceptional taxonomic difficulty, best developed in the great limestone areas of temperate eastern America, the numerous nearly related species still subject to widely different interpretation by specialists and capable at the present time only of a tentative and provisional treatment.

N. B. — In this genus, the figures are of the leaves and flowers on a scale of $\frac{2}{3}$, the whole fruit, lateral and terminal views of the fruit with the upper part of the flesh removed, and in some cases ventral views of nutlets, all natural size.

Key to Sections, etc.

a. Introduced species; leaves deeply 3-5-lobed; fruit red; calyx-lobes entire, short; nutlet solitary . . . . . § 1
a. Native species *b.*
b. Nutlets with cavities on their ventral faces.
Nutlets with shallow cavities.
Cavities 1 on each ventral face, often faint or wanting; fruit red . . . . . § 16
Cavities several on each ventral face, shallow; fruit black . . . . . § 18
Nutlets with 1 deep cavity on each ventral face . . . . . § 17
b. Nutlets without cavities on their ventral faces *c.*
c. Nest of nutlets without sinuses; fruit small.
Nutlets 2; leaves deeply lobed or cut . . . . . § 10
Nutlets 5; leaves slightly lobed or entire . . . . . § 9
c. Nest of nutlets with sinuses; fruit large or small *d.*
d. Leaves conspicuously deltoid-cordate, glabrous . . . . . § 15
d. Leaves not deltoid-cordate *e.*
e. Calyx-lobes foliaceous, persistent on fruit; flowers 1–3(–6) . . . . § 7
e. Calyx-lobes not foliaceous, often deciduous *f.*
f. Corymbs 3–7-flowered.
Leaves short-obovate to spatulate, very glandular . . . . . § 6
Leaves elliptic-ovate, slightly glandular . . . . . § 5
f. Corymbs many-flowered *g.*
g. Leaves obovate or spatulate.
Leaves coriaceous, dark green and shining above . . . . . § 2
Leaves membranaceous, dull, impressed-veined above.
Fruit glabrous; nutlets acute at both ends; calyx-lobes entire . . . § 3
Fruit slightly tomentose; nutlets obtuse at the apex; calyx-lobes serrate no. 49
g. Leaves not obovate or spatulate *h.*
h. Leaves 3-lobed toward the apex . . . . . § 4
h. Leaves not 3-lobed *i.*
i. Leaves glabrous (when mature) *j.*
j. Leaves broadest at the middle.
Fruit firm when ripe.
Nutlets 2–3 . . . . . no. 3
Nutlets 4–5 . . . . . no. 9
Fruit soft when ripe . . . . . nos. 24, 25, 26, 28
j. Leaves broadest toward the base.
Fruit firm when ripe . . . . . § 12
Fruit soft.
Leaves small (3–6 cm. wide); sinuses between the nutlets shallow; nutlets usually 3–4 . . . . . § 11
Leaves large (4–10 cm. wide); nutlets 3–5 . . . . nos. 50, 52, 53
i. Leaves pubescent (at least along the veins below).
Leaves broadest at the middle . . . . . nos. 23, 27, 28, 29, § 8
Leaves broadest toward the base.
Mature leaves usually glabrous above; young foliage bronze-green . § 13
Mature leaves tomentose above; young foliage yellow-green . . § 14

Auxiliary Key (For use in default of mature fruit)

a. Calyx-lobes entire (sometimes glandular-margined).
Leaves conspicuously deltoid-cordate, glabrous . . . . . § 15
Leaves not deltoid-cordate.
Leaves glabrous beneath, pubescent above; region of the upper Great Lakes . . § 18
Leaves pubescent beneath (at least along the veins).
Leaves deeply lobed; introduced . . . . . § 1
Leaves entire or slightly lobed; native.
Leaves broadest toward the apex.
Leaves obovate to oblong.
Leaves coriaceous, dark green and shining above . . . . . § 2
Leaves membranaceous, dull, impressed-veined above . . . . . § 3
Leaves spatulate . . . . . § 9
Leaves broadest at the middle; apex often 3-lobed . . . . . § 4
Leaves broadest toward the base, membranaceous, glabrous . . . . . § 11
a. Calyx-lobes serrate *b.*
b. Leaves deeply lobed . . . . . § 10
b. Leaves entire or slightly lobed *c.*
c. Corymbs few (1–7)-flowered.
Calyx-lobes foliaceous, laciniate . . . . . § 7
Calyx-lobes not foliaceous, glandular-serrate.
Leaves short-obovate, very glandular . . . . . § 6
Leaves elliptical-ovate, slightly glandular . . . . . § 5

a. Corymbs many-flowered.
Leaves broadest toward the apex . . . . . nos. 5, 10, 49
Leaves broadest at the middle.
Calyx-lobes serrate; nutlets plane . . . . . no. 3, § 8
Calyx-lobes deeply serrate; nutlets pitted . . . . . § 16, § 17
Leaves broadest toward the base.
Leaves glabrous . . . . . nos. 32, 33, and § 12
Leaves pubescent . . . . . § 13, § 14

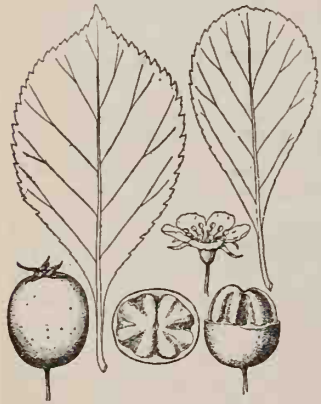
§ 1 OXYACÁNTHAE Loud. *Leaves ovate, 3–15-lobed or -cleft, acute at the apex, cuneate to truncate at the base, serrate, 1–4 cm. long, 1–4.5 cm. wide, dark green and glabrous above (when mature), paler and slightly pubescent beneath (especially along the veins); corymbs many-flowered, glabrous; flowers about 1.5 cm. wide; calyx lobes deltoid, entire, obtuse; stamens about 20; anthers pink; styles 1–2; fruit globose or subglobose, red, about 6 mm. thick; calyx-lobes reflexed, persistent; flesh of fruit yellow, mealy; nutlets usually 1; shrubs or small trees, 5–9 m. tall, with strongly ascending branches and dark brown scaly bark; thorns sharp, about 1 cm. long.*

1. C. OXYACÁNTHA L. (ENGLISH H.) Characters of the section.—Sparingly escaped from cultivation. Fl. May; fr. Sept. (Introd. from Eu.)

§ 2. CRUS-GÁLLI Loud. *Leaves obovate to elliptical, coriaceous, dark green and shining above, acute or rounded at the apex, cuneate at the base; petiole slightly winged above, glandless, 1–2 cm. long; corymbs many-flowered; calyx-lobes lanceolate-acuminate, usually entire; stamens 10–20; anthers usually pink; fruit subcylindric-ovoid to globose, red, the calyx flattened and the flesh hard, thin, greenish; nutlets 1–3 (in no. 4 sometimes as many as 5), strongly ridged on the back; trees or shrubs, usually with spreading branches forming a broad crown; bark dark gray, scaly; spines many, strong, straight, chestnut-brown, 3–18 cm. long.*

Corymbs and leaves glabrous.
Leaves 2–10 cm. long, 1–4 cm. wide; nest of 1–2 nutlets longer than thick . 2. *C. Crus-galli.*
Leaves 2–6 cm. long, 2–5 cm. wide.
Nutlets 2–3; nest of nutlets about as long as thick . . . . . 3. *C. pratensis.*
Nutlets 3–5; nest of nutlets longer than thick . . . . . 4. *C. Canbyi.*
Corymbs and leaves hairy.
Leaves large, 3–9 cm. long, 2–7 cm. wide . . . . . 5. *C. fecunda.*
Leaves small, 2–6 cm. long, 1–4 cm. wide . . . . . 6. *C. berberifolia.*

2. C. **Crus-gálli** L. *Leaves 2–10 cm. long, 1–4 cm. wide,* sharply serrate except toward the base; *corymbs glabrous;* flowers about 1.5 cm. wide; calyx-lobes glabrous or slightly pubescent; stamens about 10; styles 1–3; *fruit ellipsoidal-ovoid to subglobose, about 1 cm. thick,* greenish to dull red; *flesh hard* and dry; *nutlets usually 2, 8–9 mm. long,* 3.5–4.5 mm. thick.—Sandy soil, near Montreal, L. Champlain, Nantucket, Mass. (where probably introduced), Ct., the lower Hudson Valley to s. Ont., s. Mich., s. e. Kan., and s. to Ga. FIG. 769. Var. PYRACANTHIFÒLIA Ait. has more acute leaves and small bright red fruit.—Occasional, n. Del. to O. Var. OBLONGÀTA Sarg. Fruit ellipsoidal, bright red; nutlets acute.—Del. and e. Pa. Var. CAPILLÀTA Sarg. Leaves thinner; corymbs slightly pubescent; nutlets solitary.—Wilmington, Del. Var. EXÍGUA (Sarg.) Eggleston. Fruit ellipsoidal, bright crimson; nutlets solitary.—Ct. Var. PRUNIFÒLIA (Poir.) T. & G. Leaves sometimes 7 cm. wide. (*C. Bartramiana* Sarg.)—Occasional. Fl. May, June; fr. Oct.


769. C Crus-galli.

C. **Crus-gálli** × **macracántha** Eggleston. Broad-leaved forms with foliage as in var. *prunifolia*, the corymbs pubescent, the calyx-lobes serrate, the nutlets 2–3, their pits varying

from shallow to deep, have all the appearance of natural hybrids between these two species. (*C. persimilis* Sarg.; *C. prunifolia* of European gardens, in part.) — Occasional.

3. **C. praténsis** Sarg. *Leaves ovate-orbicular*, 2–6 cm. long, 2–5 cm. wide, coarsely or doubly serrate; flowers about 1 cm. wide; *calyx-lobes remotely glandular-serrate*, glabrous; stamens about 10; anthers yellow or pink; styles 2–3; *fruit short-ovoid to compressed-globose*, dull reddish-green; flesh somewhat succulent, mealy, yellow; *nutlets* 2–3, *about* 5 *mm. long;* nest of nutlets about 5 mm. thick. (*C. Palmeri* Sarg.; *C. grandis* Ashe.) — Low rich soil, Ill. and Mo. Fl. May; fr. Oct.

4. **C. Cánbyi** Sarg. *Leaves* oblong-obovate, 2.5–8 cm. long, 2–6 cm. wide, *doubly serrate*, often *lobed* toward the *apex;* corymbs glabrous; flowers about 1.5 cm. wide; styles 3–5; *fruit* short-ellipsoidal to globose, 1–1.5 cm. long, *dark crimson;* flesh bright red, succulent; the 3–5 *nutlets* 7–8 mm. long; nest of nutlets 6–7 mm. thick. (*C. Pennypackeri* Sarg.) — Occasional, e. Pa. and Md. Fl. May; fr. Oct.

5. **C. fecúnda** Sarg. *Leaves* oblong-obovate to oval, 3–9 cm. long, 2–7 cm. wide, *doubly serrate*, the veins strongly marked; corymbs slightly villous; *flowers about* 2 *cm. wide; calyx-lobes* coarsely *glandular-serrate;* stamens about 10; anthers purple; styles 2–4; *fruit* short-ellipsoid to subglobose, 2–2.5 *cm. long, orange-red*, slightly *pubescent;* calyx-lobes erect; flesh thick; *nutlets usually* 2–3, 8–10 mm. long; nest of nutlets 8–10 mm. thick. — Rich bottom lands, s. w. Ind. to s. e. Mo. Fl. May; fr. Oct.

6. **C. berberifòlia** T. & G. *Leaves oblong-cuneiform, spatulate, or obovate*, 2–6 cm. long, 1–4 cm. wide, rounded or acute and serrate toward the apex, *rough-pubescent above, white-pubescent or -tomentose beneath;* petioles 1 cm. long, densely tomentose; corymbs densely villous; flowers about 1.5 cm. wide; calyx-lobes slightly villous; *stamens about* 20; *anthers yellow; styles* 2–3; *fruit* subglobose, about 1 cm. thick, orange or red, slightly *pubescent;* flesh yellow; *nutlets* 2–3, about 6 mm. long; nest of nutlets about 6 mm. thick. — Gulf States. — A specimen from Mercersburg, Pa. (*Porter*) appears intermediate between this and the following.

Var. **Engelmánni** (Sarg.) Eggleston. Less pubescent; stamens about 10; anthers pink. — Va. and Mo. Fl. May; fr. Oct.

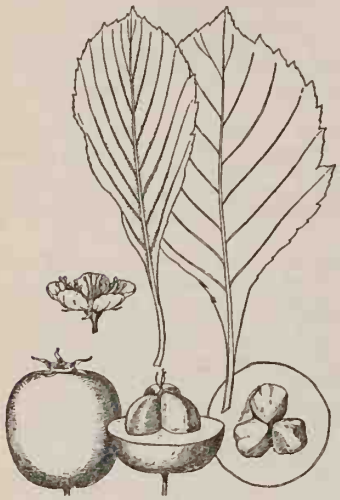
§ 3. PUNCTÀTAE Loud. *Leaves obovate to oblong, impressed-veined and usually rather dull above, mostly pubescent beneath particularly along the veins, acute or acuminate at the apex, sharply cuneate at the base, serrate, doubly serrate, or slightly lobed, but nearly entire toward the base, subcoriaceous; petioles* 1–2 *cm. long, slightly winged above; corymbs many-flowered; calyx-lobes lanceolate-acuminate, entire or sometimes glandular-margined; stamens* 10–20; *styles* 2–5; *fruit green, yellow, or red; flesh hard, thick; calyx usually flattened; nutlets* 2–5, *ridged on the back; flat-topped trees*, 3–10 *m. high, with grayish-brown bark; spines straight*, 2–7 *cm. long.*

Fruit ellipsoidal, glabrous; nutlets usually 3–4.		
Leaves bright yellow-green above; nest of nutlets longer than thick	7.	*C. pausiaca.*
Leaves dull gray-green above; nest of nutlets about as long as thick	8.	*C. punctata.*
Fruit globose, glabrous or pubescent; calyx somewhat prominent; nutlets 4–5.		
Fruit glabrous, green to scarlet; Canadian	9.	*C. suborbiculata.*
Fruit villous, red; southern	10.	*C. collina.*

7. **C. pausìaca** Ashe. *Leaves* oblanceolate-obovate, 3–6 cm. long, 1.5–4 cm. wide, dark *vivid yellow-green* and glabrous *above;* corymbs pubescent; flowers 1.2–1.5 cm. wide; *calyx glabrous*, its lobes slightly pubescent inside; *stamens* 10–15; anthers dark pink; *fruit* ellipsoidal-pyriform, about 8 mm. thick, *dull brick-red;* flesh greenish-yellow; *nutlets usually* 3, 7–10 mm. long; nest of nutlets 6–10 mm. thick. — Abundant in Pa. — Intermediate between *C. Crus-galli* and *C. punctata*, and to be expected wherever these two species are found. Fl. May; fr. Oct.

8. **C. punctàta** Jacq. *Leaves* 2–8 cm. long, 1–5 cm. broad, *dull gray-green and* strongly *impressed-veined above;* corymbs tomentose: flowers about 2 cm.

broad; *calyx-tube pubescent*, its lobes less so; *stamens usually about* 20; anthers white to pink; fruit yellow (var. AÚREA Ait.) or red (var. RÚBRA Ait.), 1.2–2.5 cm. thick; nutlets usually 3–4, 8–9 mm. long; nest of nutlets 8–10 mm. thick. — Falls of Montmorency, Que., to s. e. Minn., s. (through w. N. E.) to Pa., n. Ill., and Ia., and along the mts. to n. Ga.; ascending in N. C. to about 1800 m. Fl. May, June; fr. Oct. FIG. 770. Var. CANÉSCENS Britton is a more canescent form occasionally seen.



770. C. punctata.

9. **C. suborbiculàta** Sarg. *Leaves ovate-orbicular*, 2–7 cm. long, 2–6 cm. wide, *membranaceous*, dull dark green above, *glabrous;* petioles winged above, glandular; corymbs glabrous; flowers about 2 cm. broad; calyx-lobes slightly glandular-margined; stamens about 20; anthers rose-colored; styles 4–5; *fruit globose or compressed-globose*, 1–1.5 cm. thick, dull green to scarlet; *calyx* somewhat *prominent;* flesh yellow, containing commonly 5 *nutlets* (6–7.5 mm. long); nest of nutlets 8–10 mm. thick. — Limestone ridges in the region of Montreal. Fl. May, June; fr. Oct.

10. **C. collina** Chapm. *Leaves* obovate to *oval*, 2–6 cm. long, 1.5–5 cm. wide, yellow-green, somewhat pubescent when young; petioles slightly pubescent, winged; corymbs and calyx pubescent; flowers 1.5–2 cm. wide; *calyx-lobes glabrous* or slightly pubescent inside, *glandular-ciliate;* stamens about 20; *anthers yellow;* styles 3–5; *fruit globose or compressed-globose*, dull red, 9–12 *mm. thick; calyx* somewhat *prominent;* calyx-lobes persistent; flesh yellow, dry; *nutlets usually* 5, 6–7 mm. long; nest of nutlets 8–10 mm. thick. — Common, s. w. Va. to centr. Ga. and n. Miss. Fl. May; fr. Oct.

Var. **sórdida** (Sarg.) Eggleston. Corymbs rather few-flowered; *flowers* 2.5–3.5 cm. *broad; anthers pink;* nutlets 3–4. — Occasional, s. e. Mo. Fl. May; fr. Oct.

Var. **Lettermàni** (Sarg.) Eggleston. Stamens about 10; fruit subglobose or pyriform, orange-red. — Occasional, s. e. Mo. Fl. May; fr. Oct.

§ 4. VÍRIDES Beadle. *Leaves oblong-ovate to oval, obtuse, acute, or acuminate (often 3-lobed) at the apex, cuneate at the base, serrate or doubly serrate or lobed, dark green, shining, and glabrous above, paler and somewhat pubescent along the veins beneath, usually membranaceous; petioles* 1–3 *cm. long, slightly winged above; corymbs few-many-flowered, glabrous; calyx-lobes entire or slightly glandular-margined, triangular to lanceolate-acuminate; stamens* 10–20; *anthers yellow; styles* 2–5; *fruit glabrous, red, subglobose to ellipsoidal; flesh hard; nutlets* 3–5 (2 *in no.* 11), *ridged on the back; trees or large shrubs*, 6–11 *m. high, with ascending or nearly erect branches, dark brown bark, and straight spines* 2–5 *cm. long.*

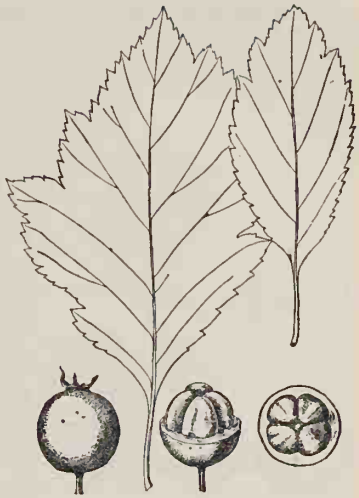
Nutlets 2; fruit large, 8–15 mm. thick; lobes of the leaves crenate . . 11. *C. Margaretta.*
Nutlets 3–5; fruit small, 5–9 mm. thick; lobes dentate.
Fruit bright red, glaucous, 4–6 mm. thick . . . . . 12. *C. viridis.*
Fruit dull dark red, 6–9 mm. thick . . . . . 13. *C. nitida.*

11. **C. Margarétta** Ashe. *Leaves* 2–6 cm. long, 2–4 cm. wide, obtuse or acute at the apex, *crenate-lobed*, slightly pubescent when young, glabrate; corymbs 5–12-flowered, slightly pubescent at first; flowers 1.5–2 cm. wide; calyx-lobes slightly pubescent inside; styles 1–3; *fruit dull rusty green to red*, 8–15 *mm. thick;* flesh yellow, dry and mealy; *nutlets usually* 2, about 6 mm. long, about

3 mm. thick; a tree, with a narrow open crown, 4–8 m. high. (*C. Brownii* Britton?) — Woods and banks of streams, s. Ont. to centr. Ia., s. to centr. Pa., w. Va., and Mo. Fl. May; fr. Oct.

12. **C. víridis** L. *Leaves* 2–8 cm. long, 2–5 cm. wide, *serrate;* flowers 1–1.5 cm. wide; calyx-lobes slightly pubescent inside; styles 4–5; *fruit* globose or depressed-globose, *bright red, glaucous*, 4–6 *mm. thick; nutlets usually* 5, 3.5–5 mm. long; nest of nutlets 3.5–5.5 mm. thick. — Moist soil of the lowlands, Chesapeake City, Md. (*Ward*), Va. (*Clayton*) to Mo., s. to Fla. and Tex. Fl. May; fr. Oct.

13. **C. nítida** (Engelm.) Sarg. *Leaves* 3–8 cm. long, 2–6 cm. wide, *coarsely serrate;* corymbs many-flowered, 1.2–2 cm. wide; *calyx-lobes lanceolate*, acuminate; *fruit* globose to short-ellipsoidal, *dark dull red*, 6–9 *mm. thick;* flesh yellow, mealy; nutlets 3–5, 4.5–7 mm. long; nest of nutlets 5–7 mm. thick; tree sometimes 9 m. high, with a broad crown. — Rare, s. Ill. to s. e. Kan. Fl. May; fr. Oct. FIG. 771.



771. C. nitida.

§ 5. INTRICÀTAE Sarg. (BOYNTONIANAE Beadle; BILTMOREANAE Beadle.) *Leaves elliptic-ovate, acute and varying from attenuate to truncate, doubly serrate or lobed (the teeth gland-tipped), subcoriaceous, yellow-green, bright above; petioles* 1–3 *cm. long, glandular, slightly winged above; young foliage usually yellow-green; corymbs* 3–7-*flowered; bracts very glandular, deciduous; calyx-lobes lanceolate-acuminate or acute, for the most part strongly toothed toward the apex, often entire at the base; stamens about* 10; *anthers usually yellow; styles* 2–5; *fruit greenish or reddish-yellow to reddish-brown, globose to pyriform, bluntly angular; calyx prominent, its lobes reflexed; flesh of the fruit hard, thick; nutlets usually* 3–4, *strongly ridged on the back; irregularly topped shrubs or small trees*, 1–8 *m. high (with occasional spines), preferring rocky woods and cliffs, more common and typical in the southern mountains.*

Foliage, corymbs, and fruit glabrous.
- Calyx-lobes nearly entire; fruit globose, yellow-green; nutlets 3–5; leaves ovate or oval . . . . . 14. *C. Boyntoni.*
- Calyx-lobes serrate; nutlets usually 3–4.
  - Leaves ovate to oval; fruit globose, red-brown or orange-red . . . 15. *C. foetida.*
  - Leaves elliptical-ovate; fruit usually pyriform, yellow-green, tinged with red . . . . . 16. *C. apposita.*

Foliage and fruit pubescent; corymbs villous.
- Fruit globose: anthers yellow.
  - Mature fruit reddish-brown; nutlets 3–4 . . . . . 17. *C. coccinea.*
  - Mature fruit yellow; nutlets 4–5 . . . . . 18. *C. biltmoreana.*
- Fruit pyriform, yellow; nutlets 3–4; anthers pink . . . . . 19. *C. Stonei.*

14. **C. Boyntòni** Beadle. *Leaves broadly ovate* or oval, *glabrous*, 2–5 cm. long, 2–5.5 cm. wide; *corymbs glabrous;* flowers about 2 cm. broad; calyx-lobes entire, except near the apex; styles 3–5; *fruit globose or depressed-globose, yellow-green*, tinged with red, 1–1.5 cm. thick; *nutlets* 3–5, 6–8 mm. long; nest of nutlets 7–9 mm. thick. — In woods and on banks of streams, between 400 and 900 m. elevation, s. w. Va., N. Car., and Tenn. Fl. May; fr. Oct.

15. **C. foétida** Ashe. *Leaves elliptical-ovate* to oval, 4.5–7 cm. long, 4–6 cm. wide, *glabrous; corymbs glabrous;* flowers about 2 cm. wide; styles 3–5; *fruit* subglobose, 1–1.5 cm. thick, *orange-red or red-brown;* nutlets usually 3–4, 6–8 mm. long; nest of nutlets 6–9 mm. thick. (*C. Baxteri* Sarg.) — Common, e. Mass. to s. Ont., s. to Va. Fl. May; fr. Oct.

16. **C. appósita** Sarg. *Leaves elliptical*-ovate, 2–7 cm. long, 1.5–5 cm. wide, *obed* (the lower pair of lobes often deeply *cut*), glabrous; corymbs and calyx glabrous; flowers 1.5–2 cm. wide; *fruit pyriform to ellipsoidal*, yellow-green, tinged with red, about 1 cm. thick; the 3–4 nutlets 5–7 mm. long; nest of nutlets 6–8 mm. thick. (*C. coccinea*, var. *viridis* T. & G., in part; *C. coccinea* Britton, not L.; *C. intricata* Sarg., not J. Lange.) — Rocky woods, s. w. Vt. and Mass. to N. Y. and Va. Fl. May, June; fr. Oct.

772. C. coccinea.

Var. **Bisséllii** (Sarg.) Eggleston. Leaves more entire; anthers pink; fruit orange-red — Ct.

17. **C. coccínea** L. *Leaves rough-pubescent*, sometimes becoming very scabrous, 2–7 cm. long, 1.5–5 cm. wide; *corymbs and calyx villous; flowers about 2.5 cm. wide;* stamens about 10; anthers light yellow; *fruit* subglobose to ellipsoidal, *pubescent*, sometimes becoming nearly glabrous, 8–10 mm. thick, yellow-green, becoming *dark reddish-brown* when fully ripe; nutlets usually 3–4, 5–7 mm. long; nest of nutlets 6–8 mm. thick. (*C. coccinea*, var. *viridis* T. & G., in part; *C. intricata* J. Lange; *C. modesta* Sarg.; *C. premora* Ashe.) — Rocky woods, e. Mass. to s. w. Vt., s. e. N. Y., w. Pa., and N. C Fl. May, June; fr. Oct., Nov. Fig. 772.

18. **C. biltmoreàna** Beadle. *Leaves* ovate-elliptical to *broadly ovate*, 2–9 cm. long, 2–7 cm. wide, *pubescent* on both sides; *corymbs* and calyx *villous;* flowers 2–2.5 cm. wide; *fruit globose* to subglobose, 1.2–1.5 cm. thick, *greenish-yellow, yellow, or orange; nutlets usually* 4–5, 5–7 mm. long; nest of nutlets 7–10 mm. thick. — Mountainous regions, Va. to N. C. and (?) Mo. Fl. May; fr. Oct.

19. **C. Stònei** Sarg. *Leaves oblong* to oblong-ovate, 7–8 cm. long, 4–6 cm. wide, *scabrate above*, slightly villous along the veins beneath; *corymbs villous;* flowers 1.5–2 cm. wide; calyx villous; *anthers pink; fruit pyriform* to short-ellipsoidal, 1.2–1.4 cm. thick, light *yellow* or yellow-green tinged with red, slightly villous; the 3–4 nutlets 6–8 mm. long; nest of nutlets 6–8 mm. thick. (*C. Peckii* Sarg.) — Centr. Mass. to Albany, N. Y. Fl. May, June; fr. Oct.

§ 6. FLÀVAE Loud. (Euflavae Beadle.) *Leaves short-obovate to spatulate, membranaceous and together with the petioles and corymbs conspicuously glandular; corymbs few-flowered; calyx-lobes glandular-serrate; fruit usually soft, green, orange, or red, subglobose to ellipsoidal; calyx prominent, its lobes reflexed; nutlets 3–5, ridged on the back; shrubs or small trees, 1–10 m. high, frequently with undulating or zigzag branches, armed with straight spines 2–6 cm. long.* — A group very abundant both in species and individuals south of our range.

20. **C. aprìca** Beadle. *Leaves* obovate, rhombic-ovate, or *orbicular*, 1.5–5 cm. long, 1.5 cm. wide, slightly pubescent, becoming very glabrous, acute at the apex, abruptly cuneate or rounded at the base, *dentate*, crenate-dentate, or lobed above the middle, dark yellow-green; petioles 7–20 mm. long, wing-margined; *corymbs 3–6-flowered*, pubescent; stamens 10; anthers yellow; *fruit globose*, 9–14 mm. thick, red or orange-red; nutlets about 7 mm. long; nest of nutlets 6–8 mm. thick. — "Sunny exposures in the mountains," s. Va., w. N. C., e. Tenn., and n. Ga. Fl. May; fr. Sept., Oct. Fig. 773.

773. C. aprica.

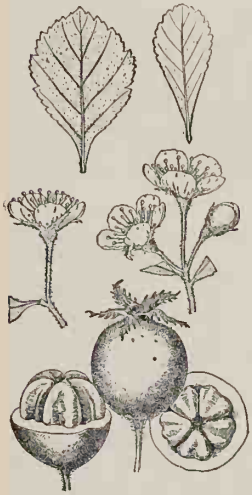
C. flàva Ait. (described from English botanical gardens) has *oval to obovate* glabrous *leaves*,

10 stamens, pink anthers, and *pyriform* yellow-green *fruit.* It should be sought in s. Va.

§ 7. PARVIFÒLIAE Loud. (UNIFLORAE Beadle.) *Leaves rather small, spatulate, obovate, or oval, obtuse, rounded, or acute at the apex, cuneate at the base, crenate, crenate-dentate, or serrate, subcoriaceous, shining above, very pubescent when young, becoming scabrate above when mature; petioles very short, pubescent, winged; corymbs tomentose, 1–6-flowered; calyx-lobes long and foliaceous, slightly pubescent, laciniate; stamens about* 20; *anthers white; styles* 5–7; *fruit pubescent, globose or pyriform, greenish-yellow or red; calyx prominent, its lobes reflexed; flesh firm; nutlets usually* 5, *often more; shrubs,* 1–4 *m. tall, armed with slender straight often foliaceous spines* 1–6 *cm. long.*

Leaves obovate or spatulate, usually obtuse; corymbs 1–3-flowered . . . 21. *C. tomentosa.*
Leaves ovate, usually acute; corymbs 3–6-flowered . . . . . 22. *C. Vailiae.*

21. **C. tomentòsa** L. *Leaves obovate to spatulate, obtuse* or rounded at the apex, 1.5–4 cm. long, 1–3 cm. wide, crenate; *corymbs* 1–3-*flowered,* flowers 1–1.5 cm. wide; *fruit subglobose,* 1–1.5 cm. thick, *yellow-green;* nutlets 7–9 mm. long, grooved on the back; nest of nutlets 8–10 mm. thick. (*C. uniflora* Muench.; *C. parvifolia* Ait.) — Sandy soil, L. I. to Fla., w. Ky., Mo., and centr. Tex. Fl. May; fr. Oct. FIG. 774. Var. SMITHII (Sarg.) Eggleston. Leaves serrate; fruit red. — Near Philadelphia. Fl. May; fr. Sept.



774. C. tomentosa.

22. **C. Vailiae** Britton. *Leaves* 2–5.5 cm. long, 1–4.5 cm. wide, *oval or ovate, acute* at the apex, cuneate at the base, crenate-serrate, often slightly 3–5-lobed; petioles 4–10 mm. long; *corymbs* 3–6-*flowered;* flowers 1–1.5 cm. wide; *fruit globose,* 8–10 mm. thick, *reddish-brown;* nutlets 5–6 mm. long; nest of nutlets 7–8 mm. thick. — Va. to n. w. Ga.; Greensboro, Ala.

§ 8. ROTUNDIFÒLIAE Eggleston. (COCCINEAE Sarg.) *Leaves elliptical-ovate to orbicular, doubly serrate or lobed, subcoriaceous, dark yellow-green and shining above; petioles glandular, slightly winged above,* 1–5 *cm. long; young foliage usually yellow-green; corymbs many-flowered; calyx-lobes glandular-serrate, usually lanceolate-acuminate; stamens* 5–20; *anthers usually yellow; styles* 2–5; *fruit depressed-globose to short-ovoid, red; flesh soft; calyx-lobes reflexed; nutlets usually* 3–4, *ridged on the back; round-topped shrubs and trees,* 3–10 *m. high, with numerous curved spines* (2–7 *cm. long*).

Leaves elliptic-ovate, sharply cuneate, deeply-incised . . . . . 23. *C. columbiana.*
Leaves ovate-orbicular, broadly cuneate or truncate at base.
  Calyx prominent; fruit subglobose . . . . . 24. *C. Macauleyae.*
  Calyx obscure.
    Fruit pyriform, yellow-red . . . . . 25. *C. Oakesiana.*
    Fruit globose, red.
      Fruit angular in cross-section.
        Fruit glabrous; flowers 2–2.5 cm. wide; leaves slightly lobed . . 26. *C. Jackii.*
        Fruit pubescent; flowers about 1.5 cm. wide; leaves sharply lobed . 27. *C. irrasa.*
      Fruit round in cross-section.
        Nest of nutlets shorter than thick; fruit about 1 cm. thick, dark red; leaves 3–6 cm. wide; anthers yellow . . . . . 28. *C. rotundifolia.*
        Nest of nutlets longer than thick; fruit about 1.5 cm. thick, carmine-red; leaves 4–8 cm. wide; anthers pink . . . . . 29. *C. Jonesae.*

23. **C. columbiàna** Howell. *Leaves cuneate-obovate or oblong,* 2–6 cm. long, 1–5 cm. wide, *incisely* 5–9-*lobed* above the middle, acute to acuminate, sparingly

villous; corymbs slightly villous; flowers about 1.5 cm. broad; *calyx* glabrous, its *lobes triangular-acuminate*, slightly villous inside, often red-tipped; stamens about 10; styles 2–5; *fruit* scarlet, *short-pyriform*, 8–12 mm. long; calyx-lobes persistent; *flesh glutinous;* nutlets usually 3–4, 6–8 mm. long; nest of nutlets 6–7 mm. thick. — Columbia R. and tributaries, e. of Cascade Mts. Fl. May; fr. Aug., Sept. Var. PIPÈRI (Britton) Eggleston. Leaves more pubescent; corymbs varying from slightly to densely pubescent; fruit pubescent. — With the typical form westward, but extending e. to s. Minn. and L. Superior.

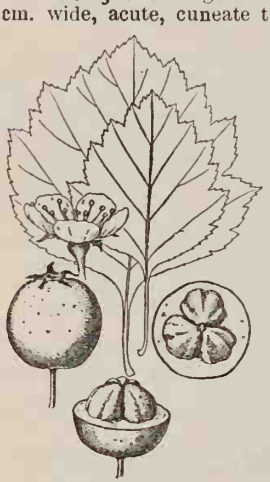
Var. **Brunetiàna** (Sarg.) Eggleston. Leaves often ovate, 2–9 cm. long, 2–8 cm. wide; corymbs slightly pubescent; calyx-lobes lanceolate-acuminate. — Nfd. to L. Superior., s. to N. S. and centr. Me. Fl. June; fr. Sept.

× ? **C. laurentiàna** Sarg. Similar to var. *Piperi*, but usually with 4–5 nutlets with occasional shallow pits on their ventral faces. — A possible hybrid, occurring near Montreal.

24. **C. Macaulèyae** Sarg. *Leaves* ovate or oval, 4–6 cm. long, 3.5–5 cm. wide, acute, abruptly cuneate or rounded at the base, *membranaceous*, glabrous, *dull dark green;* corymbs glabrous; flowers 1.6–1.8 cm. broad; calyx glabrous, its lobes pubescent inside; *stamens about* 20; *anthers small*, yellow; styles 4–5; fruit subglobose to short-ellipsoidal, dark crimson, 1–1.2 cm. thick; *calyx prominent;* flesh thin, yellow, dry; the 4–5 nutlets 7–8 mm. long; nest of nutlets 7–8 mm. thick. — Occasional, w. N. Y. Fl. May; fr. Oct.

25. **C. Oakesiàna** Eggleston. *Leaves* ovate to broadly ovate, acute or acuminate, gradually or abruptly cuneate, slightly pubescent above, becoming glabrate, 3–7 cm. long, 3–6 cm. wide, *doubly serrate* toward the apex; corymbs slightly villous; flowers about 2 cm. wide; calyx villous, its lobes glabrous outside, slightly villous inside; *stamens about* 20; anthers yellow; styles 3–5; *fruit pyriform-ellipsoidal*, slightly angular, *yellowish-red*, about 1 cm. thick; sepals deciduous; flesh soft, mealy, light yellow; *the* 3–5 *nutlets* 6–7 mm. long; nest of nutlets 7–8 mm. thick. — Valley of the Connecticut, n. e. Vt. Fl. May; fr. Aug., Sept.

26. **C. Jáckii** Sarg. *Leaves ovate-orbicular* to obovate, 3–6 cm. long, 2.5–5 cm. wide, acute, cuneate to rounded at base, *dull dark green above*, slightly pubescent, glabrate; corymbs slightly villous; *flowers* 2–2.5 *cm. wide;* calyx glabrous, its lobes sharply glandular-serrate, slightly pubescent inside; stamens 5–10; anthers yellow; styles 2–3; *fruit* ovoid-ellipsoidal, 1–1.5 *cm. thick, dull dark red, prominently angled;* flesh thick, reddish; the 2–3 nutlets 7–9 mm. long; nest of nutlets 9–10 mm. thick. (*C. rotundata* Sarg.) — Isle of Montreal to s. Ont. Fl. May; fr. Sept.



775. C. rotundifolia.

27. **C. irràsa** Sarg. *Leaves* ovate to *elliptical*, acute, broadly cuneate, or truncate at base, *with* 4–6 *pairs of acute lobes*, 3–6 cm. long, 3–6 cm. wide, *membranaceous*, slightly pubescent, becoming glabrous above, pubescent beneath, particularly along the veins; corymbs slightly villous; *flowers about* 1.5 *cm. wide;* calyx villous, its lobes slightly villous inside; *stamens about* 20; styles 3–5; *fruit* subglobose to short-ellipsoidal, slightly angled, sparingly *pubescent*, dull red, about 1 cm. thick, with persistent calyx-lobes and reddish flesh; *the* 3–5 *nutlets* 6–8 mm. long; nest of nutlets 8–10 mm. thick. — Isle of Montreal and Montmorency Falls, Que. Fl. May; fr. Sept.

Var. **divérgens** Peck. Corymbs more villous; fruit scarlet; nutlets usually 3. — Near Albany, N. Y.

Var. **Blanchárdi** (Sarg.) Eggleston. Corymbs and calyx more villous than in the typical form; anthers pink; fruit dark cherry-red. — Deerfield Valley, Vt.

28. **C. rotundifòlia** Moench. *Leaves ovate-orbicular* or obovate, 3–5 cm.

long, 2–6 cm. wide, acute, broadly cuneate, doubly serrate with rather *coarse teeth* and with 3–4 pairs of acute lobes, glabrous; corymbs glabrous or slightly pubescent; flowers about 2 cm. wide; calyx-lobes slightly villous inside; stamens 5–10; styles 2–4; fruit 1 cm. thick, red; flesh yellow, dry, sweet; *nutlets usually* 2–3, 6–7 mm. long; nest of nutlets 7–9 mm. thick. (*C. glandulosa* Ait.; *C. coccinea*, var. *rotundifolia* Sarg.; *C. Dodgei* Ashe.) — N. S. to s. Minn., s. to n. Ill., and in the Alleghenies to Va. Fl. May; fr. Sept. Fig. 775.

Var. **Bicknéllii** Eggleston. Leaves somewhat sharply lobed toward the apex; calyx-lobes long, laciniate, persistent on the fruit; nutlets usually 4–5. — Nantucket I., Mass. Fl. May; fr. Sept.

Var. **Faxòni** (Sarg.) Eggleston. Leaves, corymbs, and fruit pubescent. (*C. coccinea* Linnean herbarium, in part.) — Completely intergrading with the typical form and of the same range. Fr. Aug., Sept.

Var. **chrysocárpa** (Ashe) Eggleston. Leaves slightly smaller and fruit yellow-red; otherwise like the preceding variety. (*C. Sheridana* Nelson.) — Cook Co., Minn. (MacMillan), to Col. and Assina.

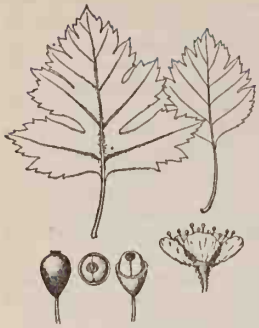
29. **C. Jonèsae** Sarg. *Leaves* elliptical-ovate, 4–10 *cm. long*, 3–8 *cm. wide*, acute or obtuse, cuneate, glabrous except along the veins beneath, the *lobes acute* and tips *reflexed;* petioles slightly pubescent, 3–5 cm. long; corymbs somewhat villous; *flowers about* 2.5 *cm. wide; calyx* villous, its *lobes linear, acuminate*, glabrous outside, slightly pubescent inside; stamens about 10; *anthers large, pink;* styles 2–3; *fruit* short-ellipsoidal to pyriform, about 1.5 *cm. thick, bright carmine-red*, slightly pubescent; flesh thick, yellow; calyx-lobes long, appressed; nutlets usually 3, about 9 mm. long; nest of nutlets about 8 mm. thick. — Mt. Desert I. and adjacent coast to Falmouth, Me. (*Chamberlain*). Fl. June; fr. Oct.

§ 9. MICROCÁRPAE Loud. *Leaves spatulate to oblanceolate*, 8–35 *mm. long*, 4–20 *mm. wide, acute or rounded and sometimes* 3–5-*lobed at the apex, sharply cuneate into a winged petiole, crenate-serrate, dark green and slightly villous along the veins above when young, then glabrate, membranaceous; flowers in many-flowered glabrous corymbs, about* 1 *cm. wide; calyx-lobes deltoid, entire; stamens about* 20; *anthers red; styles* 3–5; *fruit globose to subglobose, red*, 4–6 *mm. thick, with reflexed calyx-lobes and dry mealy flesh; nutlets* 3–5, *slightly ridged on the back*, 3–4.5 *mm. long, bare at the apex; nest of nutlets* 3.5–4.5 *mm. thick; shrub or small tree*, 6–8 *m. high; branches upright and spreading; bark grayish-brown, slightly scaly; twigs reddish-brown, glabrous; thorns sparse, straight*, 3–4 *cm. long.*

776. C. spathulata.

30. **C. spathulàta** Michx. The only species of the section. — Moist rich soil of the coastal region, Va. to Fla. and Tex.; also s. Ark. and s. e. Okla. Fig. 776.

§ 10. APHIFÒLIAE Loud. *Leaves broadly ovate to orbicular*, 1–4 *cm. long*, 1–4 *cm. wide, acute, slightly cordate to cuneate at the base, pinnately* 5–7-*lobed, simply or doubly serrate, pilose above when young, often glabrate, pilose beneath, especially along the veins, membranaceous; petioles* 2.5–5 *cm. long, tomentose; flowers about* 1.5 *cm. wide, in* 3–12-*flowered villous corymbs; calyx-lobes lanceolate, acuminate, serrate, glabrous outside, slightly pubescent inside; stamens about* 20; *anthers dark red; styles* 1–3; *fruit ellipsoid or ovoid*, 4–7 *mm. long, scarlet, slightly pubescent with reflexed calyx-lobes and thin firm flesh; nutlets commonly* 2, 5–6.5 *mm. long, smooth on the back, bare at the apex; nest* 3–3.5 *mm. thick, with no sinus between the nutlets; shrubs or small trees*, 2–6 *m. high, with nearly horizontal branches and smooth gray bark; twigs light red, long-tomentose but glabrate; thorns few, chestnut-brown*, 2.5–4 *cm. long, straight.*



777. C. Marshallii.

31. **C. Marshállii** Eggleston. The only species of the section. (*Mespilus apiifolia* Marsh.; *C. apiifolia* Michx., not Medic.) — Along streams and about swamps in the lowlands, s. Va. to Fla., w. to Mo. and Tex. Fig. 777.

§ 11. TENUIFÒLIAE Sarg. *Leaves ovate, serrate, doubly serrate, or lobed, acute or acuminate, slightly villous but glabrate, dark yellow-green above, paler beneath; petioles slender,* 1.5–3 *cm. long; young foliage usually bronze-green; corymbs many-flowered; calyx-lobes lanceolate-acuminate, usually entire (often glandular-margined), slightly pubescent inside; stamens* 5–20; *anthers usually pink; styles* 2–5; *fruit ellipsoidal, ovoid, or pyriform, red, glabrous, with rather persistent erect or spreading calyx-lobes and succulent edible flesh; nutlets usually* 3–4, *strongly ridged on the back; shrubs or small trees,* 2–7 *m. high, with ascending branches and strong curved spines* 2–7 *cm. long.* — This section is the most troublesome of any in our range, specific lines being here particularly hard to draw.

Fruit ellipsoidal, ovoid, or pyriform.
  Calyx-lobes serrate.
    Leaves broadly ovate, flabellate, the lobes reflexed . . . . . 32. *C. crudelis.*
    Leaves oblong-ovate, the lobes spreading or ascending . . . . 33. *C. lucorum.*
  Calyx-lobes entire.
    Fruit small, 6–9 mm. thick, with rather firm flesh; leaves conspicuously lobed . . . . . 34. *C. roanensis.*
    Fruit large, 1–1.8 cm. thick, with soft flesh; leaves not conspicuously lobed . . . . . 35. *C. macrosperma.*
Fruit compressed-globose or subglobose.
  Lobes of the leaves reflexed; leaves flabellate . . . . . 36. *C. Grayana.*
  Lobes of the leaves spreading or ascending.
    Terminal leaves cuneate or rounded at the base . . . . . 37. *C. alnorum.*
    Terminal leaves cordate . . . . . 38. *C. populnea.*

32. **C. crudèlis** Sarg. *Leaves* ovate to *broadly ovate,* 3–7 cm. long, 2.5–6 cm. broad, sharply lobed (*the tips of the lobes often recurved*), broadly cuneate or truncate, rarely cordate at the base, slightly *villous above, becoming scabrate* or glabrate; corymbs slightly villous at first; flowers 1.5–2 cm. wide; calyx-tube and inside of the lobes slightly villous; stamens about 10; styles 3–5; fruit ellipsoidal, 8–12 mm. thick, scarlet or crimson; *the* 3–5 *nutlets* 6–8 mm. long; nest of nutlets 6–8 mm. thick. (*Mespilus flabellata* Bosc, not *C. flabellata* Heldreich; *C. blandita* Sarg.) — Caughnawaga Reservation to Falls of Montmorency, Que. Fl. May; fr. Sept.

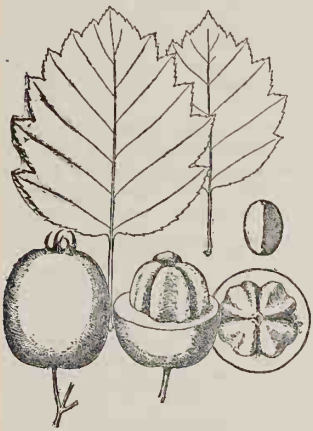
33. **C. lucòrum** Sarg. *Leaves oblong-ovate* to broadly ovate, 3–6 cm. long, 2–5 cm. wide, acute or acuminate at the apex, broadly cuneate or rounded at the base, finely and doubly serrate or lobed; *corymbs* slightly *villous;* flowers about 2 cm. broad; calyx glabrous except for a slight pubescence on the inner surface of the lobes; stamens about 20; *anthers small,* deep pink; styles 4–5; fruit pyriform-ellipsoidal, crimson, 1.5–2 cm. long. — Occasional, n. Ill. and s. e. Wisc. Fl. May; fr. Sept.

Var. ínsolens (Sarg.) Eggleston. Styles 3–5; fruit ellipsoidal, scarlet, glabrous, 1–1.2 cm. long; flesh rather firm; nutlets usually 3–4, 6–7 mm. long; nest of nutlets 6–7 mm. thick. — Rare, n. e. Vt.

34. **C. roanénsis** Ashe. *Leaves* ovate or oblong-ovate, 2.5–7 cm. long, 2–6 cm. wide, with 3–6 pairs of *acute* usually *straight lobes,* the *base* broadly cuneate to *cordate;* corymbs glabrous or slightly villous; flowers about 1.5 cm. wide; calyx-lobes slightly villous inside; stamens 5–20, usually 5–10; styles 2–5; *fruit* 7–9 *mm. thick,* 9–13 mm. long, crimson; *flesh rather firm;* nutlets 6–8 mm. long; nest of nutlets 6–7 mm. thick. (*C. fluviatilis* Sarg.; *C. ascendens* Sarg.;

C. uber Ashe.) — Montreal to Wisc., s. through w. N. E. to Pa., and in the mts. (ascending to 1800 m.) to N. C. and Tenn. Fl. May; fr. Sept.

35. **C. macrospérma** Ashe. *Leaves elliptical-ovate* to broadly ovate, rounded to truncate or rarely cordate at the base, 2.5–7 cm. long, 2–7 cm. wide, the lobes acute; corymbs glabrous or slightly villous; flowers 1.5–2 cm. wide; stamens 5–10(–20); styles 2–5; *fruit* ellipsoidal or pyriform, 1–1.8 *cm. thick*, scarlet to crimson, often glaucous; nutlets usually 3–4, 6–8 mm. long; nest of nutlets 6–8 mm. thick. — N. S. and n. Me. to n. Mich. and s. e. Minn., s. to Pa., n. Ill., and in the mts. to N. C. and Tenn. Fl. May; fr. Sept. Fig. 778. Var. PENTÁNDRA (Sarg.) Eggleston. Leaves sharply cuneate at the base. — Vt. to Va. Var. DEMÍSSA (Sarg.) Eggleston. Leaves and fruit smaller. — Occasional, w. N. E. to n. Ill. and w. Va.



778. C. macrosperma.

Var. pastòrum (Sarg.) Eggleston. Leaves more nearly entire; fruit dark crimson. — Low grounds, w. N. E. and N. Y. Var. MATÙRA (Sarg.) Eggleston. Lobes of the leaves acuminate, often recurved. — Range of the typical form. Fr. Aug., Sept. Var. ACUTÍLOBA (Sarg.) Eggleston. Lobes of leaves acuminate, recurved; leaves of vegetative shoots often cordate. — Coast of N. S. and N. E.

36. **C. Grayàna** Eggleston. *Leaves flabellate*, 2.5–8 cm. long, 2–7 cm. wide, acuminate, broadly cuneate to truncate at the base, slightly pubescent above, glabrate, *the lobes* 4–6 *pairs*, often acuminate, *their tips recurved;* corymbs slightly villous; *flowers about* 1.5 *cm. wide;* calyx-tube villous below, the lobes glabrous outside, slightly villous within, somewhat glandular-margined; *stamens about* 20; styles 3–5; *fruit subglobose* to short-ellipsoidal, *angular*, dark cherry-red, with reflexed calyx-lobes and thick yellow mealy flesh; *nutlets usually* 4–5, 6–7.5 mm. long; *nest of nutlets* 6–7 *mm. thick*, strongly ridged on the back. (*C. flabellata* Sarg., not *Mespilus flabellata* Bosc.) — Montmorency Falls to Montreal, Que., w. N. E. and n. e. N. Y. Fl. May; fr. Aug., Sept.

37. **C. alnòrum** Sarg. *Leaves ovate*, 3–7 cm. long, 2.5–6.5 cm. wide, broadly *cuneate* to truncate; corymbs glabrous; flowers 1.5–2 cm. wide; *stamens about* 20; *fruit subglobose*, 1.2–1.5 cm. thick, slightly angular, dark cherry-red; flesh yellow, acid; the 3–5 nutlets 7–8 mm. long; *nest of nutlets* 8–9 *mm. thick.* (*C. Edsoni* Sarg.) — N. E. to s. Mich. and Pa. Fl. May; fr. Sept.

38. **C. popúlnea** Ashe. *Leaves broadly ovate* to elliptic-ovate, 2.5–6.5 cm. long and wide, broadly cuneate to truncate at the base, *those on vegetative shoots usually cordate;* corymbs glabrous; flowers 1.5–2 cm. wide; *stamens* 5–10; styles 2–4; *fruit globose to short-ellipsoidal*, scarlet, 1–1.5 cm. thick, with appressed or spreading deciduous sepals and yellow flesh; *nutlets usually* 3–4, 7–8 mm. long; nest of nutlets 7–8 mm. thick. (*C. stolonifera* Sarg.) — Occasional, s. Ont. to Pa. and Del. Fl. May; fr. Sept.

§ 12. PRUINÒSAE Sarg. (SILVICOLAE Beadle.) *Leaves ovate, acute or acuminate at the apex, broadly cuneate to truncate (occasionally cordate) at the base, doubly serrate or lobed, membranaceous to subcoriaceous, blue-green, glabrous; petioles slightly glandular*, 1–3 *cm. long; young foliage usually bronze-green; corymbs many-flowered, glabrous; calyx-lobes deltoid-acuminate, often serrate at the base, glumaceous; stamens* 10–20; *anthers usually pink; styles* 3–5; *fruit usually depressed-globose to short-ellipsoidal, strongly angled, red, pruinose, with prominent spreading persistent calyx-lobes and hard thick flesh; nutlets usually* 4–5, *strongly ridged dorsally; nest of nutlets shorter than thick, with deep sinuses between the nutlets;*

shrubs or trees, 3–8 m. high, with irregular ascending branches and numerous curved chestnut-brown spines 3–6 cm. long. — Rocky woods.

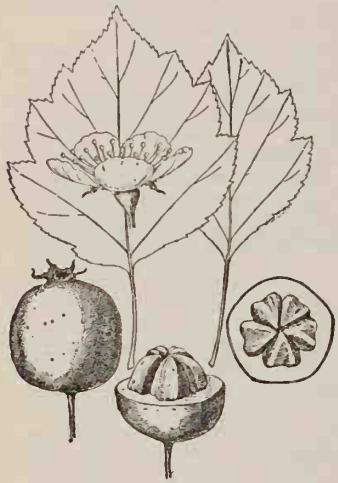
Fruit conspicuously angled, strongly pruinose.
  Leaves usually cuneate . . . . . 39. *C. pruinosa.*
  Leaves cordate . . . . . 40. *C. deltoides.*
Fruit without conspicuous angles, slightly pruinose.
  Leaves ovate, cuneate or cordate.
    Leaves usually cordate . . . . . 41. *C. silvicola.*
    Leaves usually cuneate.
      Lobes of leaves shallow, acute . . . . . 42. *C. beata.*
      Lobes of leaves deep, acuminate . . . . . 43. *C. leiophylla.*
  Leaves elliptic-ovate, cuneate . . . . . 44. *C. Jesupi.*

39. **C. pruinòsa** (Wendl.) C. Koch. *Leaves* elliptic-*ovate* to broadly ovate, 2.5–6 cm. long and wide, *membranaceous;* flowers about 2 cm. wide; stamens about 20; anthers pink, rarely yellow; *fruit* apple-green, *becoming scarlet* or purple, 1.2–1.5 cm. thick; flesh yellow, sweet; nutlets 6–8 mm. long; nest of nutlets 8–9 mm. thick. — Common, w. N. E. to s. Wisc., Mo., Va., and s. in the mts. Fl. May; fr. Oct., Nov. Fig. 779. Forma díssona (Sarg.) Eggleston. Stamens 10. — With the typical form

Var. **latisépala** (Ashe) Eggleston. Leaves more nearly entire; fruit reddish-brown. (*C. cognata* Sarg.) — With the typical form. Var. philadélphica (Sarg.) Eggleston. Leaves with more acuminate lobes, those on vegetative shoots usually cordate. (*C. fusca* Sarg.) — Range of typical form.

Var. **conjúncta** (Sarg.) Eggleston. Fruit less angular and not highly colored; anthers light yellow. — Range of typical form.

Var. **Portèri** (Britton) Eggleston. Fruit pyriform, reddish-brown. — Pocono Mt. and adjacent region, e. Pa.



779. C. pruinosa.

40. **C. deltoides** Ashe. *Leaves broadly ovate,* 3–7 cm. long and broad, abruptly acuminate at the apex, *cordate* or truncate at the base, with 4–6 pairs of *broad* acuminate *lobes;* flowers about 2 cm. broad; *stamens about* 10; *fruit depressed-globose,* bright red, 1–1.5 cm. thick; flesh yellow; nutlets 6–7 mm. long; nest of nutlets 8–10 mm. thick. — Dutchess Co., N. Y., and e. Pa. Fl. May; fr. Oct.

41. **C. silvícola** Beadle. *Leaves triangular-ovate,* 2–7 cm. long, 2–6 cm. wide, rounded, truncate, or on vegetative shoots *cordate* at the base, incisely lobed; *flowers about* 1.5 *cm. wide;* stamens 10; *fruit* globose, 1–1.1 cm. thick, *slightly angular, red;* the 3–5 nutlets 6–8 mm. long; nest of nutlets 7–8 mm. thick. — N. Ala. and n. w. Ga.

Var. **Beckwìthae** (Sarg.) Eggleston. Leaves sharply lobed; flowers about 2 cm. wide; fruit subglobose to compressed-globose, cherry red, 1.2–1.5 cm. thick; nutlets 6–8 mm. long; nest of nutlets 8–10 mm. thick. (*C. Robbinsiana* Sarg.; *C. sequax* Ashe.) — Frequent, w. N. E. to s. Mich., and s. to Pa. Fl. May; fr. Oct.

42. **C. beàta** Sarg. *Leaves* 3–8 cm. long, 2.5–7 cm. wide, broadly cuneate to truncate at the base, *acutely lobed,* membranaceous, dull; flowers about 2 cm. wide; stamens about 20; *fruit short-ellipsoidal,* slightly angular, crimson, *slightly pruinose,* 1–1.5 cm. thick; the 4–5 nutlets 6–8 mm. long; nest of nutlets 9–11 mm. thick. — Occasional, w. N. Y. and s. Ont. Fl. May; fr. Oct.

Var. **cómpta** (Sarg.) Eggleston. Leaves on vegetative shoots sometimes subcordate, subcoriaceous; flowers about 1.5 cm. wide; stamens 7–10; nutlets 3–4. — Similar range. Fl. May; fr. Oct.

43. **C. leiophýlla** Sarg. *Leaves broadly ovate*, 3–7 cm. long and wide, broadly cuneate to truncate at the base, *subcoriaceous*, dull, *with* 3–5 pairs of *acuminate spreading lobes;* flowers about 2 cm. wide; stamens about 20; *anthers yellow; fruit pyriform-subglobose*, 1.2–1.4 cm. thick, slightly angular, dark green, becoming bright red, slightly pruinose; flesh yellow; nutlets usually 4, 7–8 mm. long; nest of nutlets 8–10 mm. thick. — Frequent, w. N. Y. Fl. May; fr. Oct.

Var. **Maineàna** (Sarg.) Eggleston. Stamens about 10; anthers pink; fruit globose, dark scarlet; nutlets 6–7 mm. long. — Similar range. Fl. May; fr. Oct.

44. **C. Jesùpi** Sarg. *Leaves elliptic-ovate*, 3.5–7 cm. long, 2–5.5 cm. wide, broadly cuneate to truncate-cordate at the base, yellow-green above, *with* 4–5 pairs of *acute lobes;* flowers about 2 cm. wide; *calyx-lobes entire;* stamens about 10; *anthers dark red; fruit* short-ellipsoidal to pyriform, *dark red*, about 1 cm. thick, *slightly angled*, destitute of bloom when mature; calyx-lobes mostly deciduous; flesh yellow; nutlets usually 3–4, 6–8 mm. long; nest of nutlets 7–9 mm. thick. — Twin Mts., W. Rutland, Vt.; e. Pa.; s. Mich.; s. w Wisc.

§ 13. **COCCÍNEAE** Loud. (Flabellatae Sarg.) *Leaves large, ovate (often broadly so), simply or doubly serrate or lobed, membranaceous to subcoriaceous, when young bronze-green; corymbs many-flowered; calyx-lobes lanceolate, acuminate, glandular-serrate; stamens* 5–20; *anthers red; styles* 3–5; *fruit usually red and pubescent, subglobose, ellipsoidal, or pyriform, with soft thick flesh and commonly persistent calyx-lobes; nutlets usually* 4–5, *slightly ridged on the back; nest of nutlets usually with deep sinuses; round-topped trees or shrubs*, 3–10 *m. high, with ascending branches and curved spines* 2–8 *cm. long.* — In this section belongs *C. coccinea* Mill.; T. & G.

Fruit yellow; western	45. *C. Kelloggii.*
Fruit red.	
Leaves oblong-ovate	
Leaves sharply lobed; eastern.	
Corymbs nearly glabrous	46. *C. Holmesiana.*
Corymbs very pubescent	47. *C. anomala.*
Leaves subentire; southwestern.	
Corymbs and fruit very tomentose	48. *C. lanuginosa.*
Corymbs and fruit nearly glabrous	49. *C. pyriformis.*
Leaves broadly ovate.	
Corymbs and fruit glabrous; stamens about 20	50. *C. coccinioides.*
Corymbs and fruit pubescent or tomentose.	
Leaves on vegetative shoots cuneate.	
Leaves concave, 3–8 cm. long, 3–7 cm. wide	51. *C. Pringlei*
Leaves plane, 3–10 cm. long, 3–9 cm. wide	52. *C. pedicellata.*
Leaves on vegetative shoots cordate	53. *C. polita.*

45. **C. Kellóggii** Sarg. *Leaves* broadly ovate to *suborbicular*, 3–7 cm. long, 2.5–7 cm. wide, *rounded at the apex*, broadly cuneate or truncate at the base, lobed above the middle, dark yellow-green, slightly pubescent but glabrate above, pubescent along the veins beneath; petioles 2–3 cm. long, slender, villous when young; corymbs pubescent; *flowers about* 1.5 *cm. wide;* calyx slightly pubescent, *its lobes glabrous on the outer surface*, slightly villous within; stamens about 20; styles 5; *fruit* subglobose to short-ovoid, bright *yellow*, 2–2.5 cm. thick, with spreading calyx-lobes and yellow mealy flesh; nutlets 5, slightly grooved on the back, about 8 mm. long; nest of nutlets 9–10 mm. thick; tree 6–8 m. high, with nearly erect branches, dark furrowed bark, and occasionally straight chestnut-brown spines about 3 cm. long. — St. Louis, Mo., uncommon. Fl. Apr.; fr. Sept.

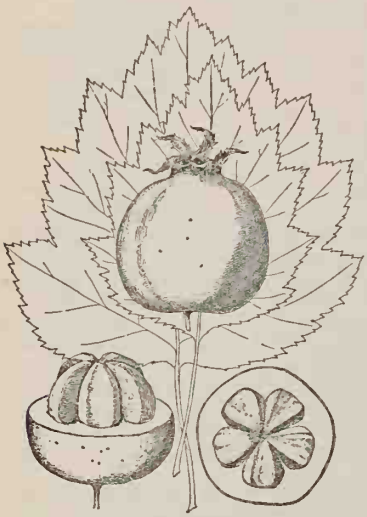
46. **C. Holmesiàna** Ashe. *Leaves elliptic-ovate*, 2.5–9 cm. long, 2–6 cm. wide, *membranaceous*, acute or *acuminate* at the *apex*, cuneate at the base, pubescent at length scabrous above, pubescent along the veins beneath, the 4–6 pairs of acute or *acuminate lobes* often *with reflexed tips;* petioles 2–3 cm. long, slightly pubescent; *corymbs glabrous* or slightly pubescent; *flowers about* 1.5 *cm. wide; stamens* 5–10; styles 3–5; *fruit pyriform* to ellipsoidal, crimson, about 1.2 cm. thick, with *enlarged* erect persistent *calyx-lobes* and yellow mealy acid flesh; *nutlets usually* 3–4, 7–9 mm. long; nest of nutlets 6–8 mm. thick;

sinuses shallow; tree sometimes 9 m. high, with ascending branches, gray-brown scaly bark, and occasional spines 4–6 cm. long.—Moist hillsides, Montreal, centr. Me., R. I., Pa., s. Mich., and s. in the mts. to s. N. C. Fl. May; fr. Aug., Sept. The form occurring from Pa. southw., var. VÍLLIPES Ashe (*C. tenuifolia* Britton), has the corymbs more pubescent.

47. C. anómala Sarg. *Leaves oblong to ovate*, 3–9 cm. long, 2–8 cm. wide, *acute* at the *apex*, broadly cuneate to truncate at base, *acutely lobed*, slightly pubescent becoming scabrous above, densely villous along the veins beneath, yellow-green; petioles pubescent, 1–2 cm. long; *corymbs* and calyx *villous*, the inside of the calyx-lobes but slightly so; flowers about 1.5 cm. wide; *stamens about* 10; *styles* 4–5, *fruit pyriform-ellipsoidal*, 1.5–2 cm. thick, crimson, with *prominent calyx*, persistent spreading slightly pubescent calyx-lobes and light yellow juicy flesh; nutlets 7–9.5 mm. long; nest of nutlets 8–9 mm. thick. (*C. oblongifolia* Sarg.)—Montreal I. to centr. Me., North Adams, Mass., and Albany, N. Y. Fl. May; fr. Oct.

48. C. lanuginòsa Sarg. *Leaves* ovate to *suborbicular*, 2.5–7 cm. long, 2–6 cm. wide, acute at the apex, broadly cuneate to *truncate at the base*, coarsely and doubly serrate, appressed-pubescent becoming scabrous above, *densely white-tomentose beneath;* petioles 5–25 mm. long, tomentose; *corymbs white-tomentose;* flowers about 2 cm. wide; calyx densely white-tomentose, its lobes ovate-lanceolate, acute; stamens about 20; styles 5; *fruit* subglobose to short-ellipsoidal, about 1.5 cm. thick, bright cherry-red, *tomentose, with prominent calyx*, spreading calyx-lobes, and orange dry and mealy flesh; nutlets 5, 6–8 mm. long; nest of nutlets 8–11 mm. thick; tree with spreading and erect branches, armed with many straight thorns 3–9 cm. long, the *young thorns* often *bearing undeveloped leaves.*—Common near Webb City, s. w. Mo. Fl. May; fr. Sept.

49. C. pyrifórmis Britton. *Leaves broadly oval* to obovate-oval, 3–7 cm. long, 2–6 cm. broad, *obtuse* at the *apex*, *cuneate* at the *base*, sharply and sometimes doubly serrate, slightly pubescent but glabrate above, pubescent especially along the veins beneath, yellow-green, *membranaceous;* petioles 1–3 cm. long, winged above, tomentose to scabrous; corymbs villous; *flowers about* 2.5 *cm. broad;* calyx villous, the lobes slightly pubescent; stamens about 20; styles 4–5; *fruit ellipsoidal-pyriform*, about 1.2 cm. thick, bright cherry-red, with reflexed calyx-lobes and light yellow juicy flesh; *nutlets ear-shaped*, about 8 mm. long; nest of nutlets about 1 cm. thick. (*C. dispessa* Ashe.)—Rich bottom lands, s. e. Mo. Fl. May; fr. Sept.



780. C. coccinioides.

50. C. coccinioides Ashe. *Leaves broadly ovate*, acute at the apex, rounded or truncate at the base, doubly serrate and with several pairs of *broad acute lobes*, 4–9 cm. long, 3.5–8 cm. wide, dark green above, paler and slightly tomentose along the veins beneath, *membranaceous;* petioles glandular, 2–3 cm. long; *corymbs* 5–7-*flowered*, glabrous; flowers about 2 cm. wide; *calyx-lobes* ovate, acute, *glandular-serrate;* stamens about 20; styles 3–5; *fruit* subglobose, *obtusely angled*, 1.5–2 cm. thick, dark crimson, with *prominent calyx*, spreading sepals and subacid red-tinged flesh; *nutlets* usually 4–5, 7–9 mm. long, 4.5–5.5 mm. thick, *grooved on the back.* (*C. Eggertii* Britton.)—Occasional, s. w. Ind. to e. Kan. FIG. 780.

Var. dilatàta (Sarg.) Eggleston. Corymbs 7–12-flowered; flowers about 1.5 cm. broad; fruit with less prominent calyx, the calyx-lobes more deciduous. (*C. speciosa* Sarg.) — Montreal I. to R. I., and w. to Mo. Fl. May; fr. Sept.

51. **C. Pringlei** Sarg. *Leaves concave*, ovate to *oval*, 3–8 cm. long, 2.5–7 cm. wide, *obtuse* at the *apex*, *rounded* or abruptly cuneate at the *base*, very *shallowly lobed*, pubescent but glabrate above, pubescent along the veins beneath, *bright yellow-green;* petioles 1–3 cm. long, pubescent; corymbs pubescent; flowers about 2 cm. wide; stamens about 10; styles 3–5; fruit short-ellipsoidal to pyriform, red, pubescent, about 1.5 cm. thick, with persistent spreading calyx-lobes and yellow acid edible flesh; nutlets 7–9 mm. long; nest of nutlets 7–9 mm. thick. — Common, w. N. E. to n. Ill., s. to Pa. Fl. May; fr. Sept. Var. EXCLÙSA (Sarg.) Eggleston. Leaves less concave; corymbs densely pubescent. — Vt. and n. e. N. Y. Var. LOBULÀTA (Sarg.) Eggleston. Leaves more deeply cut. (*C. cristata* Ashe.) — With the typical form.

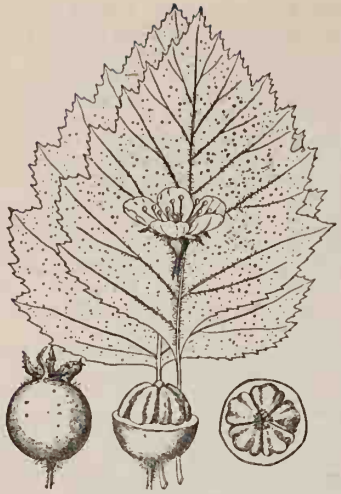
52. **C. pedicellàta** Sarg. *Leaves broadly ovate*, 3–10 cm. long, 3–9 cm. wide, *acute* or acuminate at the *apex*, *broadly cuneate* to truncate at base, slightly pubescent becoming scabrous above, nearly *glabrous beneath*, membranaceous; *corymbs glabrous* or slightly villous; flowers 1.5–2 cm. wide; *calyx glabrous*, its lobes slightly villous on the upper side; stamens 10–20; styles 3–5; *fruit* pyriform to short-ellipsoidal, scarlet, *glabrous*, 1.5–2 cm. thick, with rather persistent erect or spreading calyx-lobes and dry mealy flesh; nutlets usually 4–5, 7–8 mm. long; nest of nutlets 8–10 mm. thick. — Frequent, s. Ct. to s. Ont. and n. Ill., s. to Pa. and Del. Fl. May; fr. Sept. Var. ELLWANGERIÀNA (Sarg.) Eggleston has densely villous corymbs, fruits slightly villous, and nutlets 3–5. — Similar range.

53. **C. polita** Sarg. *Leaves* broadly ovate to oblong-ovate, *cordate*, truncate, or broadly cuneate at the base, 3–9 cm. long and wide, *membranaceous*, glabrous when mature, yellow-green; *corymbs glabrous;* flowers 1.5–2 cm. wide; calyx glabrous, its lobes slightly pubescent above; stamens 5–10; *styles* 3–4; *fruit* subglobose to short-ellipsoidal-pyriform, *glabrous*, cherry-red, 1–1.5 cm. thick, with *deciduous calyx-lobes;* nutlets sharply ridged on the back, 6–8 mm. long; nest of nutlets 6–8 mm. thick. — Occasional, w. N. E. to s. Mich., s. to Del. Fl. May; fr. Sept. Var. TATNALLIÀNA (Sarg.) Eggleston. Leaves slightly pubescent; corymbs, calyx, and fruit villous; nutlets 3–5. — With the typical form.

§ 14. MÓLLES Sarg. *Leaves large, ovate, pubescent or tomentose becoming scabrate above, acute at the apex, broadly cuneate to cordate at base, doubly serrate or lobed, yellow-green, subcoriaceous or membranaceous; petioles 2–4 cm. long, pubescent or tomentose; young foliage yellow-green; corymbs many-flowered, densely tomentose; calyx-lobes glandular-serrate, somewhat tomentose; stamens 10–20; anthers yellow; styles 3–5; fruit large, red, pubescent, globose, ellipsoidal, or pyriform, with swollen erect or spreading calyx-lobes and thick soft edible flesh; nutlets usually 4–5, slightly ridged on the back; nest of nutlets with deep sinuses; round-topped trees, sometimes 13 m. high, with curved spines 3–5 cm. long.*

Leaves on vegetative shoots cuneate at the base.		
Lobes of the leaves shallow, broad, acuminate; Mass. and Ct. . .	54.	*C. Arnoldiana*
Lobes deep, narrow, acute.		
Fruit globose or nearly so; calyx rather prominent; leaves subcoriaceous	55.	*C. canadensis*
Fruit ellipsoidal-pyriform; calyx obscure; leaves membranaceous .	56.	*C. submollis.*
Leaves on the vegetative shoots cordate.		
Leaves 4–13 cm. long, 4–10 cm. wide, rugose, membranaceous; western	57.	*C. mollis.*
Leaves 3–11 cm. long, 3–9 cm. wide, plane, subcoriaceous; Champlain Valley	58.	*C. champlainensis.*

54. **C. Arnoldiàna** Sarg. *Leaves* broadly ovate to *oval*, 3–10 cm. long, 2.5–8.5 cm. wide, broadly *cuneate* to truncate at the base, with broad *shallow* acuminate *lobes;* flowers about 2 cm. wide; stamens about 10; *fruit globose* or subglobose, 1.5–2 cm. thick, bright crimson, with scarcely enlarged spreading



781. C. Arnoldiana.

calyx-lobes; flesh yellow, acid; nutlets 8–9 cm. long; nest of nutlets 9–10 mm. thick. — Rare, e. Mass. and w. Ct. Fl. May; fr Aug. FIG. 781.

55. **C. canadénsis** Sarg. *Leaves ovate*, broadly *cuneate* to truncate at the base, *acutely lobed* toward the *apex*, 3–8 *cm. long*, 2.5–7.5 *cm. wide*, subcoriaceous; flowers about 2 cm. wide; stamens about 20; *fruit* short-ellipsoidal to subglobose, crimson, 1–1.5 *cm. thick*, with rather *prominent calyx*, spreading persistent calyx-lobes and yellow mealy flesh; nutlets usually 5, about 7 mm. long; nest of nutlets 9–10 mm. thick. — Region of Montreal. Fl. May; fr. Sept., Oct.

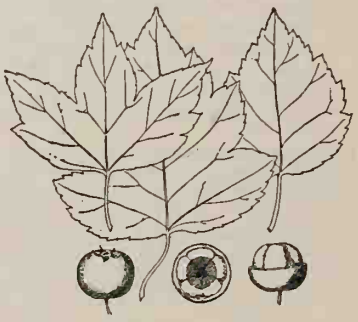
56. **C. submóllis** Sarg. *Leaves* ovate, broadly *cuneate*, *acutely lobed*, 4–11 cm. long, 3–9 cm. wide, *membranaceous*, yellow-green; flowers about 2.5 cm. wide; *stamens about* 10; *fruit* short-ellipsoidal to *pyriform*, *orange-red*, 1.5–2 cm. thick, with persistent calyx and yellow subacid flesh; nutlets strongly ridged on the back, 6–8 mm. long; nest of nutlets 7–9 mm. thick. — Falls of Montmorency, Que., to s. Ont., s. to Me., Mass., and Albany, N. Y. Fl. May; fr. Sept.

57. **C. móllis** (T. & G.) Scheele. *Leaves broadly ovate*, 4–13 cm. long, 4–10 cm. wide, *cordate* to truncate at the base, slightly *rugose*, membranaceous, densely tomentose below, with narrow *acute lobes;* flowers about 2.5 cm. wide; *stamens about* 20; *fruit* short-ellipsoidal to subglobose, *scarlet*, 1.5–2.5 cm. thick, with *deciduous calyx-lobes* and yellow flesh; nutlets usually 5, 7–8 mm. long; nest of nutlets 9–10 mm. thick. (*C. coccinea*, var. T. & G.) — Common, s. Ont. to e. S. Dak., e. Kan., and s. to Ky. Fl. May; fr. Aug., Sept.

Var. **sèra** (Sarg.) Eggleston. Leaves oblong-ovate; fruit pyriform-ellipsoidal, dull dark red. — Occasional, s. Ont., s. Mich., and n. Ill. Fl. May; fr. Oct.

58. **C. champlainénsis** Sarg. *Leaves* 3–11 *cm. long*, 3–9 *cm. wide*, *subcoriaceous; stamens about* 10; *fruit short-ellipsoidal* to pyriform, bright scarlet; *calyx* rather *prominent*, its lobes spreading, *persistent;* nutlets strongly ridged on the back, 7–8 mm. long; nest of nutlets 8–10 mm. thick. — Montreal I., s. through the Champlain Valley. Fl. May; fr. Sept., Oct.

§ 15. CORDÀTAE Beadle. *Leaves ovate-triangular, simply or doubly serrate (often conspicuously 3–5-lobed), acuminate at the apex, rounded to cordate at the base, 2–8 cm. long and wide, bright green above, paler beneath, glabrous; petioles 1.5–5 cm. long, slender; corymbs many-flowered, glabrous; flowers about 1 cm. wide; calyx-lobes deltoid, entire, pubescent on the margin; stamens about 20; anthers pink; styles 4–5; fruit depressed-globose, 4–6 mm. thick, scarlet, with deciduous calyx-lobes and thin firm flesh; nutlets 5, 3–4 mm. long, 2–2.5 mm. thick, smooth on the back; apex bare; sinuses between the nutlets shallow; shrubs or small trees, 5–9 m. tall, with nearly erect branches and grayish-brown scaly bark; twigs chestnut-brown; thorns 2–5 cm. long.*



782. C. phaenopyrum.

59. **C. phaenopỳrum** (L. f.) Medic. Only species of the section. (*Mespilus* L. f.; *C. cordata* Ait., not *Mespilus cordata* Mill.) — Along streams in the Appalachian Mts., Va. to n. Ga. and n. Ala.; s. Ill., s. Mo., and n. w. Ark.; naturalized northw. to e. Pa. and s. N. J. Fl. June; fr. Oct. FIG. 782.

§ 16. ANÓMALAE Sarg. *Leaves elliptical to ovate, finely and doubly serrate or lobed, acute at the apex, abruptly cuneate to rounded at the base, subcoriaceous or membranaceous, bright green above, pubescent (particularly along the veins beneath); petioles slightly winged above, 1–4 cm. long; corymbs many-flowered; calyx-lobes lanceolate, acuminate, glabrous outside, slightly pubescent within, glandular-serrate; stamens 5–20; anthers pink; styles 2–5; fruit subglobose to short-ellipsoidal, red, with reflexed calyx-lobes and thin succulent or glutinous flesh; nutlets usually 2–4, commonly having a shallow pit on the ventral face (a feature often lacking in individual nutlets).* — Species appearing as if natural hybrids between the *Macracanthae* and *Tenuifoliae*, but seeming now to be thoroughly established as species. Many of the group are still in need of careful study.

Fruit and corymbs pubescent; calyx-lobes sharply glandular-serrate . .	60. *C. pertomentosa.*
Fruit and corymbs glabrous; calyx-lobes remotely glandular-serrate . .	61. *C. Brainerdi.*

60. **C. pertomentòsa** Ashe. *Leaves oblong* to ovate, 3–7 cm. long, 2–6 cm. wide, slightly villous but glabrate above, *villous* beneath particularly along the veins, vivid dark green, *subcoriaceous*; petioles about 1 cm. long, villous; *corymbs and calyx densely villous;* flowers about 2 cm. wide; *calyx-lobes deeply serrate;* stamens 10–15; styles 2–3; *fruit globular* or nearly so, cherry-red, 8–13 mm. thick, villous when young; flesh yellow, succulent, mealy; *nutlets* 2–3, 5–6.5 mm. long, 2.5–3 mm. thick. (*C. campestris* Britton.) — Rocky barrens in the prairies, centr. Ia., w. Mo., and e. Kan. Fl. May; fr. Sept.

61. **C. Brainérdi** Sarg. *Leaves ovate*, acute or *acuminate*, 3–9 cm. long, 2–6 cm. wide, *membranaceous*, glabrate; *corymbs glabrous;* flowers about 2 cm. wide; calyx-lobes remotely glandular-serrate; stamens about 20; styles 2–4; *fruit short-ellipsoidal* to subglobose, about 1 cm. thick, cherry-red; flesh yellow, mealy, succulent, acid; *nutlets usually* 3–4, 5–7 mm. long, 2.5–3.5 mm. thick. (*C. Schuettei* Ashe.) — N. E. to s. Wisc., s. to Pa. and Ia. Var. SCÀBRIDA (Sarg.) Eggleston. Leaves oval to obovate, sharply cuneate, scabrate on the upper surface, pale yellow-green; stamens 5–20. — Range of typical form.

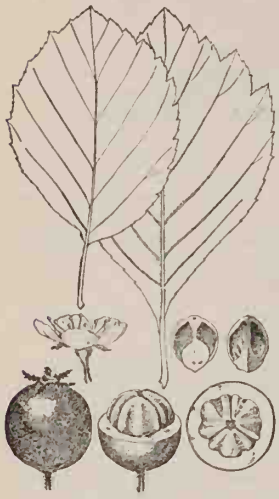
Var. **Egglestòni** (Sarg.) Robinson. Leaves oval to orbicular, dark green and shining above, subcoriaceous; flesh of the fruit rather glutinous; nutlets usually 2–3. — N. S. and N. E. to Wisc. and Pa. Var. ASPERIFÒLIA (Sarg.) Eggleston. Leaves oval, acute or acuminate, subcoriaceous, scabrate; stamens 10; fruit bright scarlet; flesh of the fruit rather firm. — Range of typical form.

§ 17. MACRACÁNTHAE Loud. (TOMENTOSAE Sarg.) *Leaves rhombic-elliptical, acute at the apex, cuneate at the base, doubly serrate with fine sharp teeth, subcoriaceous to coriaceous, pubescent when young and at least along the veins beneath at maturity; petioles slightly winged above, 1–2 cm. long; corymbs many-flowered, pubescent; calyx-lobes lanceolate, acuminate, glandular-laciniate, villous; stamens 10–20; anthers pink; styles 2–4; fruit globose, short-ellipsoidal, or pyriform, red, with reflexed calyx-lobes and thin glutinous mealy flesh; nutlets usually 2–3, dorsally ridged and with a deep pit on the ventral face; trees or shrubs, with ascending branches and numerous curved spines 3–10 cm. long.*

Leaves coriaceous, dark green and shining above	62. *C. macracantha.*
Leaves thin, dull green, pubescent, and with impressed veins above.	
Leaves 4–11 cm. long, 3–8 cm. wide; fruit and pits small; corymbs many-flowered	63. *C. Chapmani.*
Leaves 2–7 cm. long, 1.5–5 cm. wide; fruit and pits large; corymbs 3–8-flowered	64. *C. missouriensis*

62. **C. macracántha** Lodd. *Leaves* rhombic-ovate to obovate, 3–8 cm. long, 2.5–6 cm. wide, *coriaceous, dark green* and *shining above;* corymbs slightly villous; *flowers about 2 cm. wide;* stamens about 10; anthers large; styles 2–4;

fruit subglobose, about 8 mm. thick, dark cherry-red, shining, villous; nutlets usually 2–3, 5–7 mm. long, 2.5–3.5 mm. thick. (*C. coccinea*, var. Dudley.) — N. S. (*C. B. Robinson*) to Minn., s. in the mts. to Va. Fl. May; fr. Sept. FIG. 783. Var. RHOMBIFÒLIA (Sarg.) Eggleston is a form with more villous corymbs and smaller fruit. — With the typical form. Var. OCCIDENTÀLIS (Britton) Eggleston. Leaves ovate to broadly oval, sometimes 8 cm. wide. (*C. colorado* Ashe; *C. coloradensis* Nelson.) — Frequent, s. Man. to e. Kan., Col., and Ida.



783. C. macracantha.

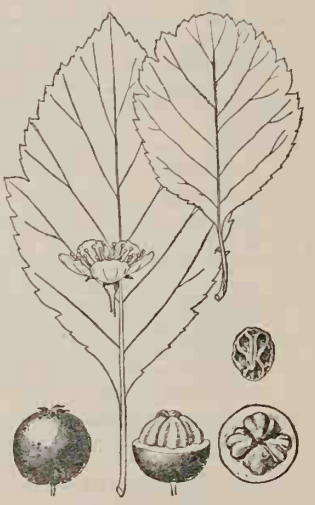
Var. succulénta (Schrad.) Eggleston. Stamens about 20; fruit larger than in the typical form — Occasional, with the typical form.

Var. **neofluviàlis** (Ashe) Eggleston. Stamens 10–20; anthers small; fruit small. — Occasional, w. N. E. to Wisc. and Pa., and s. in the mts.

63. **C. Chapmàni** (Beadle) Ashe. *Leaves* rhombic-ovate, 4–11 cm. long, 3–8 cm. wide, acute or *acuminate*, those on vegetative shoots *obtuse* and *more entire* than the others, *pubescent* on both sides, becoming *scabrate* above, *subcoriaceous*, *dull* green; petioles pubescent; corymbs white-tomentose; *flowers about* 1.5 *cm. wide;* stamens 10–20, usually about 20; *anthers small;* styles 2–4; *fruit globose* or subglobose, 8–10 mm. long, *bright red;* flesh yellow; nutlets usually 2–3, about 5 mm. long, 2.5 mm. thick, slightly ridged on the back. (*C. tomentosa*, var. *microcarpa* Chapm.; *C. tomentosa*, var. *Chapmani* Beadle.) — Frequent, s. Ky. (*C. L. Boynton*) and Va. to n. Ga. Fl. May; fr. Sept.

Var. **Plukenètii** Eggleston. *Fruit pyriform* to ellipsoidal, 1–1.5 cm. long, orange-red, villous; flesh yellow; nutlets usually 2–3, more strongly ridged on the back, 5–7 mm. long, 2.5–3 mm. thick. (*C. leucophleos* Moench? *C. tomentosa* of the Linnean herbarium and auth., not of the Linnean description.) — Common, s. Ont. to w. N. J., w. to s. Minn. and e. Kan.; and in the mts. to Ga. Fl. June; fr. Sept.

64. **C. missouriénsis** Ashe. *Leaves elliptical-ovate*, 2–7 cm. long, 1.5–5 cm. wide, subcoriaceous, simply or doubly serrate, *rough* pubescent and *shining above*, pale-tomentose beneath; *petioles* 5 *mm. long; corymbs* 3–8-*flowered*, densely white-tomentose; *flowers* 1.2–1.5 *cm. wide;* stamens about 20; anthers pink; styles 3–5; *fruit* subglobose or pyriform, about 1 *cm. thick*, bright red, slightly villous; flesh sweet; nutlets 5.5–6.5 mm. long, with *large deep pits* on the ventral faces; nest of nutlets 6–7 mm. thick; thorns straight, slender, 4–7 cm. long. — Rocky bluffs, s. Mo.; Tenn. (*Ashe*). Fl. May; fr. Sept.



784. C. Douglasii.

§ 18. DOUGLASIÀNAE [Loud.] Sarg. *Leaves ovate to obovate, acute or obtuse at the apex, cuneate at the base, doubly serrate and lobed except near the base, dark green and pubescent above (particularly along the veins), glabrous below, subcoriaceous; petioles slightly winged, pubescent and glandular; corymbs glabrous or nearly so; flowers about* 1.5 *cm. wide;*

calyx-lobes acute or acuminate, entire, villous above, tinged with red; stamens 10–20; anthers light yellow; styles 3–5; fruit short-ellipsoidal, black, 8–10 mm. thick; flesh yellow, sweet; nutlets 3–5, 5–6 mm. long, 2.5–3.5 mm. thick, ear-shaped, ridged on the dorsal and roughly pitted on the ventral face; trees or shrubs, 3–13 m. high, with ascending branches and dark brown scaly bark; twigs reddish; thorns usually 1–2 cm. long.

65. C. Douglàsii Lindl. The only species of this section within our range. (*C. glandulosa*, var. *β brevispina* Nutt.) — Common on Keweenaw Peninsula, Mich.; Michipicoten I., L. Superior; Thunder Bay I., L. Huron; and far northwestw. Fl. May; fr. Aug., Sept. Fig. 784.

9. COTONEÁSTER [Rupp.] Medic.

Calyx small, adherent to the 2–5 carpels, the 5 lobes short, persistent as teeth. Styles free, stigmatic at the slightly enlarged summit. Carpels at maturity bony, 1-seeded. Fruit small, berry-like, mealy. — Much branched shrubs with small alternate usually coriaceous and often evergreen leaves, and small white cymose flowers. (Name New Latin implying resemblance to the quince.)

1. C. Pyracántha (L.) Spach. (Fire Thorn.) Shrub, armed with slender spreading purple spines; leaves elliptic-oblanceolate, crenate-serrate, coriaceous, 3–6 cm. long; fruit globose, scarlet. (*Pyracantha coccinea* Roem.) — Attractive shrub, used for formal hedges, etc., said to have escaped from cultivation and become established in thickets, s. Pa., and southw. (Introd. from Eu.)

10. FRAGÀRIA [Tourn.] L. Strawberry

Flowers nearly as in *Potentilla*, but in varying degrees polygamo-dioecious. Styles deeply lateral. Receptacle in fruit much enlarged and conical, becoming pulpy and scarlet, bearing the minute dry achenes scattered over its surface. — Stemless perennials, with runners, and with white cymose flowers on scapes. Leaves radical; leaflets 3, obovate-wedge-form, coarsely serrate; stipules cohering with the base of the petioles, which with the scapes are usually hairy. Flowering in spring and early summer. (Name from the fragrance of the fruit.)

* *Inflorescence umbelliform or a flattish-topped cyme with subequal primary branches; calyx-lobes lanceolate, tending to be appressed or connivent about the young fruit; achenes in pits of the pulpy receptacle.*

1. F. virginiàna Duchesne. Leaves, peduncles, and runners from a subsimple caudex at the end of a simple thickish rhizome; leaflets of a firm slightly coriaceous texture; the hairs of the villous (rarely glabrate) scapes subappressed or widely spreading; pedicels silky. — Moist rich woodlands, fields, etc.; common. The typical form is a rather slender plant with the hairs of the scape loosely appressed or more or less spreading. A form with the pubescence generally more sparing, the hairs on the scapes being subappressed, is sometimes distinguished. (*F. canadensis* Michx., in part.) — Common northw. Another scarcely separable form has the hairs on both scapes and petioles sparse and subappressed. (*F. terrae-novae* Rydb.) — Northeastw. and less frequent.

Var. illinoénsis (Prince) Gray. Coarser and larger; scapes and pedicels tomentose with somewhat spreading to divaricate hairs. (*F. illinoensis* Prince; *F. virginiana*, var. *Grayana* Rydb.) — Rich soil, w. N. Y. to Minn., and southwestw.

* * *Inflorescence soon irregular and somewhat raceme-like, the primary branches of the cyme distinctly unequal; calyx-lobes lanceolate to ovate-lanceolate, loosely spreading or reflexed, much shorter than the early exposed fruit; achenes superficial or nearly so, slightly smaller than in the preceding.*

2. F. vésca L. Usually stoutish; leaflets rather deeply toothed, strongly veined above; pubescence of the petioles and stipe mostly wide-spreading, that

of the pedicels appressed; receptacle broadly ovoid-conic or subglobose. — Dooryards, old fields, dry open woods, etc.; chiefly from N. E. to Pa., often appearing as if introduced, but apparently passing without sharp limit into the following clearly indigenous var. *americana*. (Introd. from Eurasia?) Var. ÁLBA (Ehrh.) Rydb. Receptacle white. — N. E., N. Y., and Pa.

Var. americàna Porter. Slender, thin-leaved; pubescence of the scapes as well as of the pedicels and sometimes also of the petioles more or less closely appressed, often sparse; receptacle more narrowly conical or subcylindric-ovoid. (*F. americana* Britton.) — Common, chiefly in open rocky woods.

11. DUCHÉSNEA Sm. INDIAN STRAWBERRY

Calyx 5-parted, the lobes alternating with much larger foliaceous spreading 3-toothed appendages. Petals 5, yellow. Receptacle in fruit spongy but not juicy. Flowers otherwise as in *Fragaria*. — Perennial herb with leafy runners and 3-foliolate leaves similar to those of the true strawberries. (Dedicated to *Antoine Nicolas Duchesne*, an early monographer of *Fragaria*.)

1. D. ÍNDICA (Andr.) Focke. Fruit red, insipid. (*Fragaria* Andr.) — Waste ground, grassy places, etc., s. N. Y. and e. Pa. to Fla., Ark., and Mo. (Introd. from Eurasia.)

12. SIBBÁLDIA L.

Calyx flattish, 5-cleft, with 5 bractlets. Petals 5, linear-oblong, minute. Stamens 5, alternate with the petals, inserted into the margin of the woolly disk which lines the base of the calyx. Achenes 5–10; styles lateral. — Low and depressed perennials. (Dedicated to *Dr. Robert Sibbald*, professor at Edinburgh at the close of the 17th century.)

1. S. procúmbens L. Leaflets 3, wedge-shaped, 3-toothed at the apex; petals yellow. — Arctic Am., s. to mts. of e. Que., White Mts., N. H.; and in the Rocky Mts. to Utah. (Eurasia.)

13. CHAMAÉRHODOS Bunge.

Calyx top-shaped, 5-cleft, without bractlets. Petals 5, obovate, white or purplish, about as long as the calyx-lobes. Stamens 5, opposite the petals. Carpels 5–20; styles decidedly lateral or basilar, articulated near the base. Ovule solitary, ascending. — Erect pubescent essentially herbaceous plants with 3-foliolate leaves; the leaflets cleft into linear segments. (Name from χαμαί, *on the ground, low, dwarf*, and ῥόδον, *a rose*.)

1. C. erécta (L.) Bunge. Glandular-pubescent; root woody; stem erect, 1–3 dm. high, often with ascending branches, leafy; flowers small, crowded in small rounded cymes. — Sandy soil, arid prairies, etc., n. w. Minn. to Col., Mont., and Assina. (Siber.)

14. WALDSTEÌNIA Willd.

Calyx-tube inversely conical; the limb 5-cleft, with 5 often minute and deciduous bractlets. Petals 5. Stamens many, inserted into the throat of the calyx. Achenes 2–6, minutely hairy; the terminal slender styles deciduous from the base by a joint. Seed erect; radicle inferior. — Low perennial herbs, with chiefly radical 3–5-lobed or divided leaves, and small yellow flowers on bracted scapes. (Named in honor of *Francis Adam*, Count of *Waldstein*-Wartenburg, a German botanist.)

1. W. fragarioìdes (Michx.) Trattinick. (BARREN STRAWBERRY.) Low; leaflets 3, broadly wedge-form, cut-toothed; scapes several-flowered; petals mostly longer than the calyx-lobes. — Wooded hillsides, Carlton Co., N. B. (*Hay*); w. N. E. to Ga., Ind., and Minn. A form with narrow petals about equaling the calyx-lobes has been distinguished as *W. parviflora* Small.

15. POTENTÍLLA L. Cinquefoil. Five-finger

Calyx flat, deeply 5-cleft, with as many bractlets at the sinuses, thus appearing 10-cleft. Petals 5, usually roundish. Stamens many. Achenes many, collected in a head on the dry mostly pubescent or hairy receptacle; styles lateral or terminal, deciduous. Radicle superior. — Herbs, or rarely shrubs, with compound leaves, and solitary or cymose flowers; their parts rarely in fours. (Name a diminutive from *potens*, powerful, originally applied to *P. Anserina*, from its once reputed medicinal powers.)

a. Petals reddish-purple . . . . . 14. *P. palustris.*
a. Petals yellow or white *b.*
  b. Stems shrubby . . . . . 15. *P. fruticosa.*
  b. Stems herbaceous *c.*
    c. Flowers solitary, on naked peduncles from the axils of the foliage-leaves or on the stolons.
      Leaves pinnate, of numerous leaflets . . . . . 17. *P. Anserina.*
      Leaves palmate, of 3–5 leaflets.
        Tufted alpine plant . . . . . 11. *P. Robbinsiana*
        Plants with elongate slender stems.
          Earliest flower from the node above the first well-developed internode . . . . . 18. *P. pumila.*
          Earliest flower from the node above the second or third well-developed internode.
            Stems ascending or procumbent, not repent . . . 19. *P. canadensis.*
            Stems repent.
              Leaflets mostly 5, spatulate-oblong, finely crenate-dentate nearly to the base . . . . . 20. *P. reptans.*
              Leaflets mostly 3, cuneate-obovate, coarsely incised chiefly above the middle . . . . . 21. *P. procumbens.*
    c. Flowers cymose, or if solitary in the axils of reduced upper leaves *d.*
      d. Leaves pinnate.
        Inflorescence glandular-viscid . . . . . 1. *P. arguta.*
        Inflorescence not glandular.
          Leaves white-pubescent above.
            Pubescence of the leaves lustrous and silky . . . 12. *P. Hippiana.*
            Pubescence a dull tomentum . . . . . 13. *P. effusa.*
          Leaves green or greenish above.
            Leaves definitely pinnate, the leaflets essentially uniform; cyme very leafy . . . . . 4. *P. paradoxa.*
            Leaves seemingly palmate, the leaflets crowded and the lower ones much smaller than the others.
              Cyme very leafy; petals minute . . . . . 3. *P. rivalis.*
              Cyme scarcely leafy; petals showy . . . . 6. *P. pennsylvanica*
      d. Leaves palmate *e.*
        e. Petals white; leaflets toothed only at tip . . . . . 16. *P. tridentata.*
        e. Petals yellow; leaflets toothed along the sides *f.*
          f. Tufted alpine plant with 1–2-flowered short branches . . 11. *P. Robbinsiana.*
          f. Leafy-stemmed plants with cymose flowers *g.*
            g. Petioles and lower part of stem hirsute.
              Leaflets 3; petals about as long as the calyx-lobes . 2. *P. monspeliensis.*
              Leaflets 5–7; petals much exceeding the calyx-lobes . 10. *P. recta.*
            g. Petioles and stems woolly or tomentulose *h.*
              h. Leaves silvery-white beneath . . . . . 7. *P. argentea.*
              h. Leaves green or at most slightly grayish beneath *i.*
                i. Plants loosely branched, with very leafy diffuse cymes.
                  Perennial; petals obcordate . . . . . 8. *P. intermedia.*
                  Annual or biennial; petals narrowly cuneate.
                    Achenes strongly gibbous on the ventral side . 5. *P. Nicolletii.*
                    Achenes not gibbous on the ventral side . . 3. *P. rivalis.*
                i. Plants with simple stems and scarcely leafy corymbiform cymes . . . . . 9. *P. Nuttallii.*

§ 1. *Styles thickened and glandular toward the base; achenes glabrous, numerous; inflorescence cymose.*

* *Style nearly basal; stamens 25–30; perennial glandular-villous herbs, with pinnate leaves, and rather large white or yellow petals.*

1. **P. argûta** Pursh. Stems erect, usually stout, 3–10 dm. high, brownish-hairy, clammy above; leaflets 7–11, oval or ovate, cut-serrate, downy beneath; cyme strict and rather close; stamens mostly 30, on a thick glandular disk (*Drymocallis* Rydb.) — Rocky, gravelly, or alluvial soils, e. Que. to D. C., and westw. June, July.

** *Style terminal; flowers small; petals yellow.*

← *Annual or biennial; leaflets incisely serrate, not white-tomentose, stamens 5–20.*

2. **P. monspeliénsis** L. *Stout, erect, hirsute,* 2–9 dm. high; *leaves 3-foliolate;* leaflets obovate to oblanceolate, those of the uppermost leaves toothed nearly the whole length; *cyme rather close,* leafy; calyx large; stamens 15–20. — Open soil, Nfd. to Alaska, s. to D. C., Mo., Kan., and N. Mex. May–Aug. (E. Asia.)

Var. **norvégica** (L.) Rydb. Less hirsute; leaflets more narrowly oblong, those of the uppermost leaves mostly 3–5-toothed near the end; inflorescence looser. (*P. norvegica* L.) — Similar situations, e. Que. to n. N. E., L. Superior, and northwestw.; occasional on ballast southw. (Eurasia.)

Var. **labradórica** (Lehm.) Fernald. Low (1–3 dm. high, in exposed situations acaulescent); stem glabrous or sparingly silky-villous; leaves smoothish. — Lab. to the alpine regions of the White Mts., N. H.

3. **P. rivàlis** Nutt. *More slender and branched, softly villous; leaves pinnate, with two pairs of closely approximate leaflets, or a single pair and the terminal leaflet 3-parted;* leaflets cuneate-obovate or -oblong; *cyme loose, often diffuse,* less leafy; *calyx small;* petals minute; stamens 10–20 (rarely 5). — Neb. to Mo., N. Mex., and westw. May–Aug.

Var. **millegràna** (Engelm.) Wats. Leaves all 3-foliolate; lateral leaflets not divided; stems erect, or weak and ascending; achenes often small and light-colored. (*P. leucocarpa* Rydb.) — Minn. to Mo., westw. and southwestw.

Var. **pentándra** (Engelm.) Wats. Leaves digitately 3-foliolate, the lateral leaflets of the lower leaves parted nearly to the base; stamens 5, opposite the sepals. (*P. pentandra* Engelm.) — Minn. to Mo. and Ark.

4. **P. paradóxa** Nutt. *Stems decumbent at base* or erect, often stout, leafy, *subvillous; leaflets pinnately* 5–11, obovate or oblong; *cyme loose, leafy;* stamens 20: *achenes strongly gibbous on the ventral side.* (*P. supina* of auth., not L.) — Prairies and river banks, w. N. Y. and Ont. to Ill., Mo., N. Mex., and B. C. June–Aug. (Asia.)

5. **P. Nicollètii** (Wats.) Sheldon. Slender; leaflets mostly 3; *inflorescence* much elongated, leafy, falsely *racemose.* (*P. supina,* var. Wats.) — Sandy soil, Mo. (*Bush*) to N. Dak.

← ← *Herbaceous perennials, more or less white-tomentose; leaflets incisely pinnatifid; bractlets and sepals nearly equal; stamens 20–25.*

6. **P. pennsylvánica** L. Stems erect or decumbent at base, 2–6 dm. high; leaflets 5–9, white-tomentose beneath, short-pubescent and greener above, oblong, obtuse, the linear segments slightly or not at all revolute; cyme fastigiate but rather open. (*P. litoralis* Rydb.) — Coast of N. H., Me., and the lower St. Lawrence, L. Superior, and westw. June–Aug.

§ 2. *Styles filiform, not glandular at base; inflorescence cymose.*

* *Style terminal; achenes glabrous; stamens 20; herbaceous perennials, with rather large yellow petals.*

← *Leaves palmate.*

↔ *Flowers in loose leafy cymes.*

7. **P. argéntea** L. (Silvery C.) *Stems* ascending or depressed, 1–5 dm. long, paniculately branched at the summit, many-flowered, *white-woolly;* leaflets 5, wedge-oblong, almost pinnatifid, entire toward the base, with revolute margins, green above, white with silvery wool beneath; *calyx white-tomentose.* — Dry barren fields, etc., N. S. to Dak. and southw. to D. C. June–Sept. (Eu.)

8. **P. intermèdia** L. Coarser; the stout upright *grayish-tomentulose stems* 3–7 dm. high; leaflets 3–5, the lateral and often the terminal deeply cleft, oblanceolate to narrowly obovate, coarsely dentate, green above, grayish-villous and tomentulose beneath; cyme somewhat leafy and diffuse; *calyx villous*

hirsute.—Roadsides and waste places, local, Mass. to N. J. and Mich. (Adv from Eu.)

*** Flowers in rather compact scarcely leafy cymes (stems only 1–2-flowered in n. 11).*

= Leaves 5–9-foliolate; flowers numerous.

9. **P. Nuttállii** Lehm. *Stems* several, ascending from a stoutish base, 2–? dm. high, somewhat *villous or glabrate; leaflets* oblanceolate or spatulate, the narrow divergent teeth extending halfway to the midrib, green above, *glabrous or glabrate* and scarcely paler *beneath;* cyme with few upright branches.—Meadows and banks of streams, Minn., Man., and westw. June–Aug.

10. **P.** RÉCTA L. *Stems* upright, very leafy, 3–7 dm. high, loosely *hirsute; leaflets* oblanceolate, with narrowly deltoid divergent teeth, more or less *hirsute on both surfaces*, paler beneath; calyx hirsute; the showy yellow corolla 2 cm. broad. (*P. sulphurea* Lam.)—Fields and roadsides, Me. to Ont., Ill., and D. C. June–Aug. (Nat. from Eu.)

= = Leaves 3-foliolate; flowers 1 or 2.

11. **P. Robbinsiàna** Oakes. Dwarf, tufted, villous when young; leaflets broadly cuneate-obovate, deeply 3–5-toothed at summit, nearly glabrous above; flowers mostly solitary, small, on very slender stems; bractlets and sepals subequal. (*P. frigida* Man. ed. 6, not Vill.)—Alpine summits of the White Mts., N. H. June, early July.

*** Leaves pinnate.*

12. **P. Hippiàna** Lehm. Densely white-tomentose and *silvery-silky throughout*, the upper surfaces of the leaves a little darker; stems ascending, 1.5–6 dm. high, slender, branching above into a diffuse cyme; *leaflets* 5–11, cuneate-oblong, *incisely toothed* at least toward the apex, *diminishing uniformly down the rhachis;* carpels 10–30.—Prairies and banks of streams, w. Minn. to Sask. and N. Mex. June–Aug.

13. **P. effûsa** Dougl. *Tomentose throughout* and with scattered villous pubescence; stems ascending, 1–3 dm. high, diffusely branched above; *leaves interruptedly pinnate, the leaflets* 5–11, *the alternate ones smaller*, cuneate-oblong, *coarsely incised-serrate or dentate;* carpels 10.—Dry plains, w. Minn. to Assina. and N. Mex.

*** Style lateral; purple petals (shorter than the broad calyx) somewhat persistent; disk thick and hairy; achenes glabrous; hairy receptacle becoming large and spongy.*

14. **P. palústris** (L.) Scop. (MARSH F.) Stems stout, ascending from a decumbent rooting perennial base, 1–6 dm. long, glabrous below; leaves pinnate; leaflets 5–7, oblong, serrate, lighter colored and more or less pubescent beneath; flowers few in an open cyme; calyx 2–2.5 cm. broad, dark purple inside. (*Comarum* L.)—Cool bogs, Lab. to Alaska, s. to N. J., Pa., Great L. region, n. Ia., Wyo., and Cal. June–Aug. (Eurasia.)

**** Style attached below the middle; achenes and receptacle densely villous; woody perennials.*

15. **P. fruticòsa** L. (SHRUBBY C.) *Stem erect, shrubby*, 1–8 dm. high, much branched; *leaves pinnate; leaflets* 5–7, crowded, oblong-lanceolate, *entire*, silky, usually whiter beneath and the margins revolute; *petals yellow, orbicular.* (*Dasiphora* Rydb.)—Wet or dry open ground, Lab. to Alaska, s. to N. J., Pa., Great L. region, n. Ia., Ariz., and Cal. June–Sept. (Eurasia.)

16. **P. tridentàta** Ait. (THREE-TOOTHED C.) Stems low (3–22 cm. high), rather woody at base, tufted, ascending, cymosely several-flowered; *leaves palmate; leaflets* 3, wedge-oblong, nearly smooth, thick, *coarsely 3-toothed at the end; petals white;* achenes and receptacle very hairy. (*Sibbaldiopsis* Rydb.)—Lab. to e. N. E., where common in exposed rocky or gravelly situations, N. J., and southw. on the upper Alleghenies; also westw. chiefly along the Great Lakes. June–Aug.

§ 3. *Styles filiform, lateral; peduncles axillary, solitary, 1-flowered; achenes glabrous; receptacle very villous; herbaceous perennials, with yellow petals.*

17. **P. Anserina** L. (Silver Weed.) *Spreading by slender many-jointed runners, white-tomentose and silky-villous; leaves all radical, pinnate;* leaflets 7–21, with smaller ones interposed, *oblong*, sharply serrate, silky-tomentose at least beneath; bractlets and stipules often incisely cleft; peduncles elongated. (*Argentina* Rydb.) — Brackish marshes, river-banks, etc., Arctic Am., s. to. N. J., Great L. region, Ia., N. Dak., N. Mex., and Cal. June–Aug. (Eurasia.) *P. Egedii* Wormsk., at least as to forms in our range, appears to be a dwarf state common on exposed rocks. Var. *grandis* T. & G., is merely a luxuriant state in rich meadows.

Var. **cóncolor** Ser. Leaflets silky-canescent above as well as beneath. — Common in the Rocky Mts., and in less pronounced form from n. N. Y. to n. Me. and e. Que.

18. **P. pùmila** Poir Stems very slender, soon prostrate and repent, appressed-villous, *flowering from the node above the first well-developed internode; leaves* 3-foliolate but *apparently 5-foliolate* by the parting of the lateral leaflets; *leaflets* cuneate-obovate, incisely dentate, obscurely appressed-villous above, *silky-canescent beneath.* — Dry soil, common, coast of Me. to Md. Apr.–early June. — A loosely spreading-villous doubtfully distinct plant from Mo. and southeastw. may well be P. carolinìana Poir.

19. **P. canadénsis** L. *Suberect* (2–7 dm. high) *or procumbent*, at length often rooting at the tip; *stem spreading-hirsute, flowering from the node above the second well-developed internode;* leaves divided as in the preceding; leaflets commonly more oblong, serrate rather than dentate, obscurely villous or entirely glabrate above, canescent-silky to green and merely appressed-villous on the veins beneath. — Dry sandy soil, s. Me. to Vt., along the Great Lakes to Minn., Kan., and southw. May–July.

Var. **símplex** (Michx.) T. & G. *Stem* covered *with* shorter *appressed or sub-appressed hairs or glabrate;* leaflets (apt to be oblanceolate) rather shortly appressed-villous on the veins beneath. (*P. simplex* Michx.) — Chiefly in dry sandy soil, very common; N. S., southw. and westw.

20. **P. réptans** L. *Stems* almost filiform, sparingly pubescent or glabrate, *prostrate and usually repent;* leaves much as in *P. pumila;* the *leaflets* green on both faces, sparingly strigose-pubescent or glabrate, *cuneate-oblanceolate, crenate-dentate nearly or quite to the base; stipules* usually small and *inconspicuous;* bractlets ovate-lanceolate, about equaling the calyx-lobes; petals broadly obcordate, half longer than the calyx-lobes. — Grass-land and waste places, local, Mass. to N. J. and O. June. (Adv. from Eu.)

21. **P. procúmbens** Sibth. Similar, strigose-pubescent; *leaflets* 3 (rarely 5), *cuneate-obovate, coarsely incised chiefly above the middle; stipules conspicuous;* bractlets linear-lanceolate. (*P. nemoralis* Nestler.) — Grassy and waste places, Cape Breton I., N. S. (Nat. from Eu.)

16. FILIPÉNDULA [Tourn.] Hill.

Flowers perfect or polygamous. Calyx (4–)5-parted. Petals (4–)5, short-clawed. Stamens 20 or more, almost hypogynous, the disk obscure. Carpels 5–15, free, 2-ovuled, mostly 1-seeded, indehiscent, compressed, sometimes twisted. — Perennial herbs, with pinnate leaves and panicled cymose flowers. Stipules kidney-shaped. (Name from *filum*, a thread, and *pendulus*, hanging, in allusion, it is said, to the roots.)

1. **F. rùbra** (Hill) Robinson. (Queen of the Prairie.) Glabrous, 6–25 dm. high; *leaves* interruptedly pinnate, *green* and *scarcely paler beneath;* terminal leaflet large, 7–9-parted, the lobes lance-oblong, incised and toothed; lateral leaflets also cut; petals deep peach-blossom-color. (*Spiraea lobata* Gronov.; *Ulmaria rubra* Hill.) — Meadows and prairies, Pa. to Mich., Ia., Ky., and Ga.; also locally established northeastw. June, July.

2 F ULMÀRIA (L.) Maxim. (QUEEN OF THE MEADOW.) *Leaves canescent-tomentose beneath;* terminal leaflet 3–5-lobed, lobes ovate, doubly serrate; the lateral leaflets mostly unlobed; petals white. (*Spiraea* L.; *Ulmaria* Barnhart.) — Commonly cultivated; established at several places in N. E. and Que. July. (Introd. from Eurasia.)

17. GÈUM L. AVENS

Calyx bell-shaped or flattish, deeply 5-cleft, usually with 5 small bractlets at the sinuses. Petals 5. Stamens many. Achenes numerous, heaped on a conical or cylindrical dry receptacle, the long persistent styles forming hairy or naked and straight or jointed tails. Seed erect; radicle inferior. — Perennial herbs, with pinnate or lyrate leaves. (A plant name used by Pliny.)

§ 1. EUGÈUM T. & G. *Styles jointed and bent near the middle, the upper part deciduous and mostly hairy, the lower naked and hooked, becoming elongated; head of fruit sessile in the calyx; calyx-lobes reflexed.*

* *Petals white or pale greenish-yellow, small, spatulate or oblong; stipules small.*

← *Receptacle of the fruit densely hairy.*

1. G. canadénse Jacq. *Stem* (0.6–1.1 m. high) *and petioles sparingly hairy;* leaves soft-pubescent beneath or glabrate, the basal of 3–5 leaflets or undivided, those of the stem mostly 3-divided or -lobed, rather sharply toothed; *stipules ovate-oblong,* 1–1.5 *cm. long, subentire; petals white.* (*G. album* J. F. Gmel.) — Borders of woods, etc., widely distributed.

2. G. flàvum (Porter) Bicknell. *Stem and petioles hirsute;* leaves much as in the preceding but more bluntly toothed; *stipules ovate or obovate, usually about* 2 *cm. long, conspicuously cleft; petals greenish-yellow.* — Dry woods, Ct. to O. and Va.

← ← *Receptacle of the fruit glabrous or nearly so.*

3. G. virginiànum L. *Bristly-hairy, especially the stout stem;* lower and root-leaves pinnate, very various, the upper mostly 3-parted or divided, incised; petals inconspicuous, shorter than the calyx; heads of fruit larger, the short stout peduncles hirsute with reflexed hairs; *receptacle glabrous* or nearly so. — Borders of woods and low grounds; common. June–Aug.

* * *Petals golden-yellow, conspicuous, broadly obovate, exceeding the calyx; stipules larger and all deeply cut.*

← *Terminal segment of leaves suborbicular, finely crenate-dentate.*

4. G. macrophýllum Willd. Bristly-hairy, stout, 3–9 dm. high; root-leaves lyrately and interruptedly pinnate, with the *terminal leaflet very large and round heart-shaped;* lateral leaflets of the stem-leaves 2–4, minute, the terminal roundish, 3-cleft, the *lobes wedge-form and rounded; receptacle nearly naked.* — Rich soil, Nfd. to Alaska, s. to mts. of n. N. E. and N. Y., Mich., n. Wisc., Minn., Col., and Cal. (N. E. Asia.)

← ← *Terminal segment of leaves cuneate-obovate or oblanceolate.*

↔ *Leaves incisely toothed; body of ripe achene* 1–2 *mm. long.*

5. G. stríctum Ait. Somewhat hairy, 9–15 dm. high; root-leaves interruptedly pinnate, the leaflets wedge-obovate; *leaflets of the stem-leaves* 3–5, *rhombic-ovate or oblong, acute; receptacle downy.* — Moist meadows, thickets, etc., Nfd. to B. C., s. to N. J., Pa., Ill., Mo., and N. Mex. July, Aug. (Asia.)

↔ ↔ *Leaves bluntly toothed; body of ripe achene* 4–5 *mm. long.*

6. G. URBÀNUM L. Smoothish, loosely branched; segments of stem-leaves mostly rhombic-obovate; petals yellow, about equaling the calyx. — Established in Cambridge, Mass. (Adv. from Eu.)

§ 2. STÝLIPUS (Raf.) T. & G. *Styles smooth; head of fruit conspicuously stalked in the calyx; bractlets of the calyx none; otherwise nearly as* § 1.

7. **G. vérnum** (Raf.) T. & G. Somewhat pubescent; stems ascending, few-leaved, slender; root-leaves roundish-heart-shaped, 3–5-lobed, or some of them pinnate, with the lobes cut; petals yellow, about the length of the calyx; receptacle smooth. — Thickets, Ont. to Tenn., Tex., and Kan.

§ 3. CARYOPHYLLÀTA [Tourn.] Ser. *Style jointed and bent in the middle, the upper joint plumose; flowers large; calyx erect or spreading; petals erect.*

8. **G. rivàle** L. (WATER OR PURPLE A.) Stems nearly simple, several-flowered, 6 dm. high; root-leaves lyrate and interruptedly pinnate, those of the stem few, 3-foliolate or 3-lobed; flowers nodding; calyx purplish, campanulate, the lobes in anthesis 6–10 mm. long; *petals dilated-obovate, retuse, contracted into a claw, purplish-orange;* head of fruit stalked, its pedicel erect. — Bogs and wet meadows, Nfd. to Sask., s. to N. J., Pa., Mich., and Col. (Eu.)

× **G. púlchrum** Fernald. Hirsute, 6–8 dm. high; in habit and foliage similar to the preceding; flowers smaller; lobes of the purple calyx 4–5 mm. long, widely spreading; *petals clear golden yellow, obovate, less contracted at base;* styles rich carmine. — Boggy meadows, Bic, Rimouski Co., Que.; also Mendon, Vt. (*Eggleston*); Alberta. — Apparently a hybrid of *G. macrophyllum* and *G. rivale.*

§ 4. SIEVÉRSIA (Willd.) T. & G. *Style not jointed, wholly persistent and straight; head of fruit sessile; flowers large; calyx erect or spreading. (Flowering stems simple, and bearing only bracts or small leaves.)*

9. **G. triflòrum** Pursh. Low, softly hairy; root-leaves interruptedly pinnate; leaflets numerous and crowded, oblong-wedge-form, deeply cut-toothed; flowers 3 or more on long peduncles; *bractlets linear, longer than the purple calyx, as long as the oblong purplish erect petals; styles very long* (5 cm.) *strongly plumose in fruit.* (*G. ciliatum* Pursh; *Sieversia ciliata* G. Don.) — Calcareous soil, Lab., Nfd., Watertown, N. Y. (*Crawe*), Ont., Wisc., Ill., and westw.

10. **G. Péckii** Pursh. Smoothish; *root-leaves rounded-kidney-shaped,* radiate-veined, 5–12 cm. broad, doubly or irregularly cut-toothed and obscurely 5–7-lobed, with a set of minute leaflets down the long petiole; stems 1.5–4 dm. high, 1–5-flowered; *bractlets minute; petals yellow, round-obovate* and more or less obcordate, exceeding the calyx (1 cm. long), *spreading; styles naked* except at the base. (*G. radiatum*, var. Gray; *Sieversia* R. Br.) — Exposed slopes, Me., and alpine summits of White Mts., N. H.

18. RÙBUS [Tourn.] L. BRAMBLE

Calyx 5(3–7)-parted, without bractlets. Petals 5, deciduous. Stamens numerous. Achenes usually many, collected on a spongy or succulent receptacle, becoming small drupes; styles nearly terminal. — Perennial herbs, or somewhat shrubby plants, with white (rarely reddish) flowers, and usually edible fruit. (The Roman name, kindred with *ruber*, red.)

§ 1. IDAEÓBATUS Focke. *Prickly-stemmed shrubs; fruit falling off whole from a dryish receptacle when ripe; leaves pinnately 3–7-foliolate.* RASPBERRY.

1. **R. idaèus** L. *Stems upright,* and with the stalks, etc., *beset with stiff straight bristles* (or a few becoming weak hooked prickles), glandular when young, somewhat glaucous; leaflets 3–5, oblong-ovate, pointed, cut-serrate, whitish-downy underneath, the lateral ones sessile; petals as long as the *sepals; the latter velvety,* with or *without* a few scattered setiform *prickles; fruit light red.* — Thickets, e. Que., L. Superior region, and Rocky Mts. (Eurasia.)

Var. **aculeatíssimus** [C. A. Mey.] Regel & Tiling. (WILD RED R.) *Calyx bristly-hispid* with setiform prickles. (*R. strigosus* Michx.) — Thickets and hills, Lab. to B. C., s. to N. J., Pa., Great L. region, and along the mts. to N. C.,

N. Mex., and Ariz. Forma ÁLBUS (Fuller) Fernald has white or amber-colored fruit.

Var. **anómalus** Arrhenius. Dwarf (1–3 dm. high), scarcely or not at all armed; *leaves simple*, broadly ovate and shallowly 3-lobed, or 3-foliolate with rounded ovate obtuse leaflets; calyx somewhat hispid. — Limestone ledges, Cavendish, Vt. (*Eggleston*); and (?) woods, Clarke, Ind. (*Umbach*), the latter recently described as *Batidaea heterodoxa* Greene.

× ? R. **negléctus** Peck. Habit and glaucous canes of no. 3, the *stems and branches* often *rooting at the tip*, but with *slender straightish prickles* of the preceding species; calyx somewhat setose; *fruit purplish-red.* — Rocky woods, gravelly banks, etc., N. E. to Ont., Pa., and O. — Probably a self-perpetuating hybrid between *R. occidentalis* and *R. idaeus*, var. *aculeatissimus.*

2. R. PHOENICOLÀSIUS Maxim. (WINEBERRY.) Leaflets 3, broadly ovate, obtusish; *inflorescence* crowded and *with the petioles, branches, and* even the main *stems covered with* long soft densely crowded *reddish or purple gland-tipped hairs;* prickles scattered, slender; fruit broadly ovoid, cherry-red. — Sometimes cultivated, and now established at Fairfield, Ct. (*Eames*); Painesville, O. (*Hacker*), etc. (Introd. from Japan.)

3. R. **occidentàlis** L. (BLACK R., THIMBLEBERRY.) *Glaucous all over; stems recurved, rooting at tips, armed* like the stalks, etc., *with hooked prickles, not bristly;* leaflets 3 (rarely 5), ovate, pointed, coarsely double-serrate, whitened-downy underneath, the lateral ones somewhat stalked; petals shorter than the sepals; *fruit purple-black*, ripe early in July. — Copses, fence rows, etc., N. B. and s. w. Que., southw. and westw. Forma PÁLLIDUS (Bailey) Robinson has yellow or amber fruit.

§ 2. ANAPLÓBATUS Focke. *Unarmed shrubs; leaves simple, 3–5-lobed or angled; flowers large and showy; fruit large, hemispherical, red.* RUBACER Rydb.

4. R. **odoràtus** L. (PURPLE FLOWERING R.) *Shrubby*, 1–1.6 m. high; *branches, stalks, and calyx bristly with glandular-clammy hairs;* leaves 3–5-lobed, the lobes pointed and minutely toothed, the middle one prolonged; peduncles many-flowered; flowers showy (3–6 cm. broad); calyx-lobes tipped with a long narrow appendage; *petals rounded, purple rose-color;* fruit scarcely edible. — N. S. to Ga., w. to Mich. Var. COLUMBIÀNUS Millspaugh has been distinguished by the narrower more lanceolate doubly serrate lobes of the leaves, smaller flowers (2–3 cm. in diameter) and musky fruit. (*R. columbianus* Rydb.) — W. Va.

5. R. **parviflòrus** Nutt. (SALMON BERRY.) *Glandular*, scarcely bristly; leaves almost equally 5-lobed, coarsely toothed; peduncles few-flowered; *petals oval, white.* (*R. nutkanus* Mociño.) — Rocky woods, shores, etc., w. Ont., n. Mich., Minn., and westw.

§ 3. CHAMEMÒRUS (Ehrh.) Focke. *Unarmed creeping herbs, with upright branches, few orbicular simple leaves, and solitary terminal monoecious or dioecious flowers; fruit amber-colored, becoming yellow and separating from the dryish receptacle.*

6. R. **Chamaemòrus** L. (CLOUDBERRY, BAKED-APPLE BERRY.) Low (1–3 dm. high); *branches simple, 2–3-leaved;* leaves roundish-kidney-form, somewhat 5-lobed, serrate, wrinkled; calyx-lobes pointless; petals obovate, white; fruit about 2 cm. in diameter, very juicy when ripe. — In sphagnous bogs, Arctic Am., southw. in the coastal region to e. Me.; also on mountain tops, w. Me. and n. N. H. (Eurasia.)

§ 4. CYLÁCTIS (Raf.) Focke. *Low, essentially herbaceous (soft-woody at base); leaves 3(–5)-foliolate; fruit red, not separating easily from the receptacle.*

7. R. **triflòrus** Richards. (DWARF R.) *Stems* ascending, 1–4 dm. high, or *trailing* and more elongated; leaves 3(or pedately 5)-foliolate; *leaflets rhombic-ovate or ovate-lanceolate, acute at both ends*, coarsely and doubly serrate, *thin*,

smooth; peduncles 1–3-flowered; *petals small, erect*, white or pink; fruit of rather large juicy but acid drupelets. (*R. americanus* Britton.) — Wet woods, etc., Lab. to Alaska, southw. to N. J., the Great L. region, n. Ia., and Neb. — Sepals and petals often 6–7.

8. R. árcticus L. *Stems suberect*, 5–20 cm. high, filiform; *leaflets* 3(–5), *cuneate-obovate, rounded at the tip*, somewhat *firm, glossy above*, coarsely serrate-dentate; *petals* rather *large, spreading, rose-colored* (rarely white); fruit as in the preceding. — Boggy places, Arctic Am., southw. to e. Que. and n. Minn. (Boreal and Arctic Eurasia.)

§ 5. EÙBATUS Focke. *Armed (rarely unarmed) shrubs; stems biennial; leaves on the first year's growth mostly 5-foliolate (pedate), on the flowering canes chiefly 3-foliolate; fruit not separating from the juicy receptacle, blackish when ripe (reddish in no. 34).* BLACKBERRY. — A group of great taxonomic difficulty, in which many species have been recently proposed. Of these, the better marked have been here freely included, but without entire confidence that future intensive study may not show them to be intergradient and perhaps in some cases hybrid forms.

a. Canes erect or arched-ascending *b.*
- *b.* Pedicels habitually unarmed, often pubescent or glandular-hispid, rarely with a few weak bristles *c.*
  - *c.* Pedicels copiously glandular-hispid.
    - Leaflets appressed-villous above; prickles of the stem stoutish — 9. *R. allegheniensis.*
    - Leaflets glabrous above; prickles of the stem setiform rather than thorn-like.
      - Petioles of the 5-foliolate leaves scarcely or not at all glandular, copiously armed with hooked prickles; leaflets rhombic-lanceolate or narrowly ovate.
        - Lower surface of the leaflets velvety to the touch . . — 10. *R. flavinanus.*
        - Lower surface of the leaflets essentially glabrous . . . — 11. *R. junceus.*
      - Petioles of the 5-foliolate leaves copiously glandular-pubescent, weakly armed.
        - Fruit of 30–60 small drupelets . . . . . — 12. *R. glandicaulis.*
        - Fruit of few large drupelets . . . . . — 13. *R. frondisentis.*
  - *c.* Pedicels glandless or with only occasional gland-tipped hairs *d.*
    - *d.* Lower surface of leaflets even at maturity downy to the touch *e.*
      - *e.* Inflorescence numerously flowered, at length elongated and more or less cylindrical.
        - Inflorescence provided with 4–6 unifoliolate petioled bracts — 14. *R. frondosus.*
        - Inflorescence with 1–2 unifoliolate petioled bracts . . — 15. *R. pergratus.*
      - *e.* Inflorescence mostly fewer-flowered, corymbiform.
        - Canes erect or nearly so; teeth of the leaflets deltoid-ovate, mucronulate-acuminate; prickles of stem few, weak, 1–2 mm. long . . . . . — 16. *R. sativus.*
        - Canes commonly recurved and often rooting at tip; teeth of leaflets lanceolate, narrowly acuminate; prickles of stem mostly 3–5 mm. long . . . . . — 17. *R. recurvans.*
    - *d.* Lower surface of leaflets glabrous, glabrate, or nearly so.
      - Internodes of main stem and petioles of 5-foliolate leaves armed with numerous slender or bristle-formed prickles.
        - Prickles chiefly or exclusively on the angles; leaflets of the mature 3-foliolate leaves small, rarely over 5 cm. long . — 18. *R. elegantulus.*
        - Prickles on the faces as well as the angles of the stem; leaflets of the 3-foliolate leaves larger, often 6–8 cm. long . — 19. *R. peculiaris.*
      - Internodes and petioles with few prickles or unarmed.
        - Inflorescence corymbiform . . . . . — 20. *R. Randii.*
        - Inflorescence racemiform, subcylindric . . . . . — 21. *R. canadensis.*
- *b.* Pedicels armed with stoutish or slender but pungent bristle-formed prickles *f.*
  - *f.* Leaflets laciniate-cleft; introduced . . . . . — 22. *R. laciniatus.*
  - *f.* Leaflets not laciniate-cleft *g.*
    - *g.* Lower surfaces of the leaflets velvety to the touch.
      - Leaflets white-tomentose beneath . . . . . — 23. *R. cuneifolius.*
      - Leaflets green or merely grayish beneath.
        - Prickles of the first year's growth rigid.
          - Pedicels copiously glandular-pubescent . . . . — 24. *R. Andrewsianus.*
          - Pedicels tomentulose but not glandular.
            - Stems rigid, not rooting at the tip; prickles on the first year's growth 5–7 mm. long . . . . — 25. *R. floricomus.*
            - Stems flexuous, often rooting at the tip; prickles on the first year's growth 2–5 mm. long . . . — 26. *R. Jeckylanus*
        - Prickles on the first year's growth numerous, weak, bristle-formed, on the surfaces as well as the angles of the stem — 27. *R. abbrevians*

g. Lower surface of the leaflets green and essentially glabrous.
Canes armed with few firm prickles mixed with numerous setae; pedicels with gland-tipped setae . . . . . 28. *R. biformispinus.*
Canes armed with nearly uniform and very numerous setae.
Pedicels and sepals with numerous and conspicuous gland-tipped setae . . . . . 29. *R. setosus.*
Pedicels and sepals minutely and obscurely glandular-pubescent or glandless, their bristles free from glandularity 30. *R. nigricans.*
a. Canes trailing or at least with a decided tendency to be prostrate toward the end *h.*
h. Pedicels covered with copious gland-tipped setae.
Sepals dorsally glandular-hispid.
Stem and petioles of the first year's growth with numerous glandular bristles among the abundant prickles . . . . 31. *R. permixtus.*
Stem and petioles of the first year's growth less copiously armed and without glandular bristles . . . . . 32. *R. tardatus.*
Sepals not dorsally glandular-hispid . . . . . 33. *R. jacens.*
h. Pedicels not glandular or at most finely and obscurely glandular-tomentulose.
Fruit red or reddish, small; leaflets subcoriaceous, shining; flowers several, in corymbiform racemes . . . . . 34. *R. hispidus.*
Fruit black.
Prickles much broadened at base; those of the pedicels numerous, strong.
Petioles, pedicels, etc., scarcely or not at all glandular; peduncles 1-3-flowered . . . . . 35. *R. trivialis.*
Petioles, pedicels, etc., covered with reddish gland-tipped hairs; peduncles 3-several-flowered . . . . . 36. *R. rubrisetus.*
Prickles merely acicular; those of the pedicels few and weak, or none.
Leaflets of first year's growth finely and doubly serrate . . 37. *R. villosus.*
Leaflets of first year's growth coarsely and simply serrate . 38. *R. invisus.*

9. **R. allegheniénsis** Porter. Shrubby, 1–2 m. tall; old canes purplish, armed with *stout straightish prickles; leaflets appressed-villous above, velvety beneath; branchlets, pedicels* (unarmed), etc., *glandular-pubescent;* flowers 2.5–3.5 cm. broad, racemose, only the lower leafy-bracted; petals narrowly obovate; *fruit* (rarely pale) generally *subcylindric*, of many rather small drupelets, of good flavor. (*R. villosus* Man. ed. 6, in large part, not Ait.; *R. nigrobaccus* Bailey.) — Dry open thickets and recent clearings, N. S. to Ont. and N. C., common. Forma albìnus (Bailey) Fernald (White Blackberry) has amber-colored fruit. Var. calycòsus Fernald. Sepals elongated and leaf-like; fruit dry, abortive. — A local sport, N. H. to Va.

Var. **Gravèsii** Fernald. Unarmed; canes paler, mostly greenish; inflorescence much elongated (2–3 dm.) — Ct. (*Graves*).

10. **R. flavinànus** Blanchard. *Erect*, 5–10 dm. high; old canes reddish, abundantly armed with *slender curved prickles; leaflets glabrous above, velvety beneath; pedicels* (unarmed) *glandular-pubescent;* flowers 2–2.5 cm. broad; petals oblong-spatulate; *fruit* poor, *with few drupelets.* — Stratton, Vt.

11. **R. júnceus** Blanchard. Erect or at length reclining; *canes* slender, *weak*, 6–9 dm. high, *with weak recurved prickles; leaflets* incisely toothed, *glabrous above, essentially glabrous beneath;* racemes short, becoming 6–8 cm. long; *pedicels* (unarmed) *glandular-hispid;* flowers 2–2.5 cm. broad; petals oblong-spatulate; *fruit globose*, of few drupelets. — Dry open places, York Co., Me.

12. **R. glandicaúlis** Blanchard. *Strict*; *canes* (purplish in age) 1–2 m. high, *glandular-hispid and with numerous stout straightish prickles;* leaflets glabrous above, velvety beneath; racemes rather short; *rhachis and pedicels glandular-hispid;* flowers 2.5–3 cm. broad; petals narrowly obovate; *fruit cylindrical, of* 30–60 *small drupelets*, of good quality. — Dry open places, N. S. to s. Me., near the coast.

13. **R. frondiséntis** Blanchard. Erect; old *canes* (purplish) slender, 9–15 dm. high, *closely covered with fine prickles and stalked glands;* leaflets mostly large, glabrous above, velvety beneath; racemes short, somewhat corymbiform; *rhachis and pedicels very glandular-hispid;* flowers 2–3 cm. broad; petals narrowly obovate; *fruit* small, *short-cylindric, of few rather large drupelets.* — Dry open soil, s. w. N. H. and s. e. Vt.

14. **R. frondòsus** Bigel. *Canes arched-recurving, with stout straightish*

prickles; leaflets subglabrous above, velvety beneath; *racemes* cylindrical, somewhat elongated, *provided for more than half their length with nearly uniform unifoliolate* ovate-oblong petiolate *very persistent bracts; pedicels scarcely* or not at all *glandular;* flowers 2.5–3 cm. broad; petals broadly obovate; *fruit subglobose, falling before the bracts;* drupelets rather few. (*R. villosus*, var. Torr.; *R. philadelphicus* Blanchard.) — Dry rocky hillsides, e. Mass. to D. C.

15. **R. pergràtus** Blanchard. *Erect*, 1–2 m. high; old canes strongly furrowed, purplish, with *stout broad-based straightish subremote prickles;* leaflets sparingly villous (at length for the most part glabrate) above, velvety beneath; racemes short-cylindric; *rhachis and pedicels villous, essentially glandless;* flowers 2.5–3.5 cm. broad; petals broadly obovate; *fruit short-cylindric*, with numerous juicy drupelets. (*R. orarius* and *R. amnicolus* Blanchard.) — Open ground, N. B. to Vt. and Mass., common.

16. **R. sativus** (Bailey) Brainerd. *Erect* or nearly so, 3–7 dm. high; *canes* rather *weak, greenish, unarmed or with few small prickles; leaves* even on the first year's shoots *chiefly 3-foliolate; leaflets* short, *broadly ovate*, glabrous or nearly so above, velvety beneath, *with deltoid teeth; inflorescence a few-flowered small corymb*, leafy at base; flowers 1.5–2 cm. broad; petals narrowly obovate; *fruit subglobose, of few* large juicy *drupelets.* (*R. villosus*, var. Bailey? *R. nigrobaccus*, var. Bailey?) — Alluvial soil, w. Vt. (*Brainerd, Eggleston*), and presumably westw.

R. ARGÙTUS Link, of this group, an American species, described from specimens cultivated in Berlin, has been variously interpreted, but cannot now be certainly identified from the flowering material preserved.

17. **R. recúrvans** Blanchard. Erect or *recurving, often rooting at the tip; canes firm*, obtusely 5-angled, often much elongated (2–4 m. long), purplish, *remotely armed along the angles with strong straightish prickles;* leaflets smoothish above, velvety beneath, *sharply and irregularly toothed; racemes* short, leafy toward the base, *corymbiform;* flowers 2–2.5 cm. broad; petals obovate; *fruit short-cylindric, with* rather *numerous* large juicy *drupelets.* (*R. arundelanus* Blanchard.) — Open soil, in thickets, etc., N. E., common.

18. **R. elegántulus** Blanchard. Erect, 6–12 dm. high; *canes* slender, glabrous, *armed chiefly on the angles with slender straightish prickles; leaflets* of the mature 3-foliolate leaves *small, glabrous on both surfaces*, rather firm, *sharply toothed; inflorescence of slender* sometimes compound leafy-bracted *racemes;* pedicels filiform, sometimes bearing scattered setae, obscurely tomentulose; flowers 2.5–3 cm. broad; petals oblong-spatulate; fruit globose, with few large drupelets. — Uplands, s. w. N. H. and s. e. Vt.

19. **R. peculiàris** Blanchard. Erect or slightly recurving; old *canes* purple, 5-angled, *armed on the faces as well as the angles with numerous setiform prickles; leaflets* of the mature 3-foliolate leaves *large, glabrous on both surfaces*, rather *coarsely serrate-dentate;* inflorescence a *short raceme*, leafy-bracted at base; flowers 2.8–3 cm. broad; petals oblong-obovate; fruit subglobose, of few rather large drupelets. — Dry ground, York Co., Me.

20. **R. Rándii** (Bailey) Rydb. *Slender weakly armed* reddish or greenish *canes suberect or recurved*, sometimes elongated and rooting at the tip, subterete; *leaflets thin, glabrous on both surfaces, sharply and irregularly toothed; inflorescence a few-flowered corymbiform raceme*, leafy-bracted at base; *pedicels* filiform, nearly unarmed, often glabrate, *flexuous;* flowers 2–3 cm. broad; petals narrowly obovate; *fruit subglobose, of few drupelets.* (*R. argutus*, var. Bailey, *R. recurvicaulis* Blanchard.) — River banks, alluvial soil, etc., Nfd. to Vt. and Ct.

21. **R. canadénsis** L. *Erect or recurving, often stout;* old *canes* glabrous, *unarmed or with rare prickles; leaflets glabrous on both surfaces, finely, evenly, and sharply toothed, those of the 5-foliolate leaves caudate-acuminate; racemes cylindric*, rather long, leafy-bracted at base; pedicels filiform, tomentulose, not glandular; flowers 2.5–4 cm. broad; petals obovate; *fruit subglobose to short-cylindric*, of large and juicy but somewhat acid drupelets. (*R. amabilis* Blanchard.) — Rocky soil, in thickets, etc., Nfd. to L. Superior, s. chiefly in the uplands to N. C.

R. MILLSPAUGHI Britton, a robust plant of W. Va., is but little known. In technical characters it scarcely differs from the preceding species, of which it may well prove a luxuriant form.

22. R. LACINIÀTUS Willd. Readily recognized by its *laciniate-cleft leaflets, prickly calyx, and broad-based pale prickles.* — Sometimes cultivated and now locally established, s. N. Y., e. Pa., and Del. — A plant of unknown origin, perhaps only a cut-leaved form of the European *R. fruticosus* L.

23. R. cuneifòlius Pursh. (SAND B.) Shrubby, 3–12 dm. high, upright or ascending, armed with *stout recurved prickles; branchlets and lower surface of leaves white-tomentose; leaflets wedge-obovate, thickish, serrate above the middle; peduncles 1–4-flowered;* corolla 2–3 cm. broad. — Rocky or sandy soil, Ct. to Fla., La., and Mo.

24. R. Andrewsiànus Blanchard. *Erect or arched-ascending*, not rooting at the tip, 9–15 dm. high; old *canes* stout and stiff, prominently angled and furrowed, purplish, strongly *armed with broad-based straight prickles; leaflets sparingly pubescent above, velvety beneath*, rather *finely* and sharply *serrate;* racemes short; *rhachis and pedicels tomentose and glandular-hispid*, the latter bearing slender hooked prickles; *calyx* somewhat *glandular;* flowers 2.5–3 cm. broad; petals obovate, abruptly narrowed at base to a long claw; *fruit short-cylindric*, large, *of about 30 juicy drupelets.* — Sandy plains near the coast, Mass. to Va.

25. R. florícomus Blanchard. Erect and somewhat *rigid*, 8–14 dm. high; *canes strongly angled and grooved*, greenish or purplish, *stoutly armed with long firm straightish needle-pointed prickles;* branchlets somewhat tomentose, and as well as the pedicels, petioles, and often midnerves beset with stout hooked prickles; *leaves* firm, *glabrate above, rusty-velvety beneath; leaflets coarsely* and sharply *toothed;* raceme 7–12-flowered, corymbiform; pedicels widely spreading; *rhachis, pedicels, and calyx softly villous-tomentose; fruit subglobose, with few* rather large *drupelets.* — Southington, Ct.; (?) Jaffrey, N. H., and (?) Weybridge, Vt. (*Brainerd*).

26. R. Jeckylànus Blanchard. *Recurved-ascending, the branches often rooting at the tip; canes subterete, sparingly armed with short slender prickles; leaves* glabrate above, velvety beneath, those *of the flowering branches overtopping the* corymbiform few-flowered *inflorescence; rhachis and pedicels* softly tomentose, *not glandular*, the latter sparingly beset with very fine straight prickles; leaflets sharply and unequally dentate; flowers about 3 cm. broad; petals elliptical; *fruit globose*, of few large drupelets. — Open places, York Co., Me.

27. R. abbrèvians Blanchard. *Erect*, 3–6 dm. high; the slender terete *canes firm*, reddish brown, *closely beset with fine straight prickles and gland-tipped bristles; leaves rather small*, smoothish above, *velvety beneath;* leaflets on the fruiting canes broadly obovate, coarsely dentate; racemes short, subcorymbiform, leafy-bracted at base; *rhachis and pedicels glandular-hispid and setulose;* flowers 2.5 cm. broad; petals narrowly obovate; *fruit short-cylindric*, of few large finally sweet drupelets. — Uplands of Windham Co., Vt.

28. R. biformispìnus Blanchard. *Reclining;* the elongate terete purplish *flexuous canes armed with scattered straightish prickles and numerous smaller in part gland-tipped bristles; leaves glabrous on both surfaces;* racemes short, leafy-bracted at base; *rhachis and pedicels glandular-hispid and with scattered hooked prickles;* flowers 2–2.5 cm. broad; *fruit globose*, of few drupelets. — Dry open ground, York Co., Me.

29. R. setòsus Bigel. Ascending; the terete *canes* (in age purplish) *densely covered with retrorse bristles and shorter gland-tipped hairs; leaves* rather large, *glabrous on both surfaces*, usually equaling or surpassing the corymbiform several-flowered racemes; petioles often setulose; *rhachis and pedicels densely glandular-hispid* and mostly setose; flowers 1.5–2.5 cm. broad; petals oblong-spatulate; fruit subglobose. (*R. nigricans* Rydb., in part.) — Meadows and swamps, P. E. I. to Vt. and Ct.

30. R. nígricans Rydb. Similar, more upright, 6–12 dm. high; *canes armed with numerous fine prickles, but without glands;* leaflets glabrous on both

surfaces; *pedicels and sepals obscurely or not at all glandular.* (*R. hispidus*, var. *suberectus* Peck; *R. setosus* of auth., in part, not Bigel.; *R vermontanus* Blanchard; *R. semisetosus* Blanchard?) — Open places, e. Que. to N. Y. and Mich.

31. **R. permíxtus** Blanchard. Recurving and *soon prostrate; stems (as well as petioles, rhachis, pedicels, etc.) densely glandular-hispid and armed with* scattered stronger straightish or more often *curved prickles; leaflets* glabrous above, *velvety beneath*, rather small, those of the flowering canes 2-6 cm. long; racemes few-flowered, short; flowers 1.5–2 cm. broad; *calyx glandular-hispid;* petals oblong-spatulate; *fruit short-cylindric*, with few large drupelets, sweet. — Dry soil in open places, s. e. Vt.

32. **R. tardàtus** Blanchard. Decumbent, *becoming prostrate;* the subterete slender *stems with numerous straightish prickles, but with few or no glands;* petioles smooth or sparingly prickly; *leaflets smooth on both surfaces*, those of the flowering stems 4–10 cm. long; racemes somewhat compound, corymbiform; pedicels glandular-hispid, occasionally setulose; flowers 2 cm. broad; petals narrowly obovate; *fruit globose*, of few large sour drupelets. — Sandy soil, York Co., Me. — Perhaps merely a form of the next.

33. **R. jàcens** Blanchard. Similar, but the *stem* more *glandular;* leaflets of the flowering stems 2–5 cm. long; *sepals dorsally free from glands;* fruit globose, of a few sweet drupelets. — Dry open places, s. w. N. H.

34. **R. híspidus** L. *Prostrate* or nearly so; the *slender* terete often elongated *stems* more or less *beset with retrorse prickles;* the branches suberect, 5–30 cm. high; *leaflets* glabrous on both surfaces, of firm texture, *subcoriaceous, rather dark green and somewhat shining above; racemes few-flowered, corymbiform;* rhachis and pedicels occasionally setulose; *flowers* 1.5–2 *cm. broad; fruit small, reddish-purple*, of few small sour drupelets. — Low woods and swampy meadows, N. S. to s. w. Ont. and N. C., common.

35. **R. triviàlis** Michx. *Prostrate; stems* terete, elongated, slender, *armed (as are also the petioles and often the peduncles) with broad-based flattish short hooked retrorse prickles, not conspicuously glandular; leaflets coriaceous*, evergreen, elliptical, rather sharply serrate; *peduncles* 1–3-*flowered*, *flowers* 3–4 *cm. broad;* petals broadly obovate; *fruit cylindrical*, of many drupelets. — Dry soil, Va. to Fla. and Tex., near the coast.

36. **R. rubrisètus** Rydb. Similar; the *stems, petioles, and* especially the *pedicels glandular-hispid* with reddish or purplish hairs; *corymbs* 3–9-*flowered; flowers* 1.5–2.5 *cm. broad;* petals oblong-spatulate. — Sandy soil, Mo. to La. and Fla.

37. **R. villòsus** Ait. (Dewberry.) Becoming *prostrate; stems* elongate, subterete, *rather woody, armed with stout slender retrorse straightish prickles; fruiting branches* upright, 1–3 dm. high, (1–)3–15-*flowered; leaflets* rhombic-obovate, *doubly and rather finely serrate*, acutish, membranaceous, smooth or sparingly villous beneath; *flowers in leafy corymbiform racemes*, 2–3 *cm. broad; sepals not foliaceous;* fruit subglobose to short-cylindric, with few-many large juicy drupelets. (*R. canadensis* of auth., not L.; *R. procumbens* Muhl.) — Dry open places, s. Me., westw. and southw., common. Var. roribáccus Bailey. (Lucretia D.) A large-flowered extreme, with elongated pedicels; the *flowers* 4 *cm. broad; sepals* often *foliaceous.* — W. Va., where doubtfully native; and in cultivation.

Var. **humifúsus** T. & G. *Stems* slender, *less woody; flowering branches chiefly* 1-*flowered; flowers* large, 3–4 *cm. broad.* (*R. Enslenii* Trattinick; *R. Baileyanus* Britton; *R. subuniflorus* Rydb.) — Chiefly near the coast, from e. Mass. southw.

(Several recently proposed species are obviously related to and not very clearly distinct from *R. villosus* and await further study.)

38. **R. invìsus** (Bailey) Britton. Similar, but stouter; the canes less procumbent; *leaflets, especially those of the vegetative shoots, simply and rather coarsely toothed; pedicels long* (becoming 1.5 dm. in length); *sepals* large, *foliaceous.* — N. Y. to Kan. and southw. — The original of several cultivated Dewberries.

19. DALIBÀRDA Kalm.

Calyx deeply 5–6-parted, 3 of the divisions larger and toothed. Petals 5, sessile, deciduous. Stamens many. Ovaries 5–10, becoming nearly dry seed-like drupes; styles terminal, deciduous. — Low unarmed perennials, with creeping and densely tufted stems or rootstocks, and roundish-heart-shaped crenate leaves on slender petioles. Flowers of 2 kinds, a few upright long-peduncled usually sterile ones with white petals, and numerous fertile apetalous ones on short curved peduncles. (Named for *Thomas François Dalibard*, a French botanist of the time of Linnaeus.)

1. **D. rèpens** L. Downy; sepals of the petaliferous flowers spreading, of the cleistogamous ones converging and inclosing the fruit. — Woods, N. B. to Ont., s. to N. J., Pa., O., Mich., and Minn. June–Aug.

20. ALCHEMÍLLA L. Lady's Mantle

Calyx-tube inversely conical, contracted at the throat; limb 4-parted with as many alternate accessory lobes. Petals none. Stamens 1–4. Pistils 1–4; the slender style arising from near the base; achenes included in the tube of the persistent calyx. — Low herbs, with palmately lobed or compound leaves, and small corymbed greenish flowers. (From *Alkemelyeh*, the Arabic name, having reference to the silky pubescence of some species.)

1. **A.** arvénsis Scop. (Parsley Piert.) Small *annual*, 4–20 cm. high; *leaves 3-parted*, with the wedge-shaped lobes 2–3-cleft, pubescent; flowers fascicled opposite the axils. — N. S. (according to Lawson); D. C. (where said to be extinct); Va. to Tenn. and Ga. (Adv. from Eurasia.)

2. **A.** praténsis F. W. Schmidt. *Perennial*, 1–3 dm. high, from a stout caudex; *leaves orbicular*, 2–10 cm. in diameter, deeply cordate, finely serrate, *shallowly 5–9-lobed;* inflorescence paniculate; pedicels filiform. — Dry roadsides, etc., N. S., where locally abundant near coast; also casual at Westford, Mass. (*Miss Fletcher*) (Nat. from Eu.)

21. AGRIMÒNIA [Tourn.] L. Agrimony

Calyx-tube top-shaped or hemispherical, the throat beset with hooked bristles, indurated in fruit and inclosing 2 achenes; the limb 5-cleft, closed after flowering. Petals 5, yellow. Stamens 5–15. Styles terminal. — Perennial herbs, with interruptedly pinnate leaves, crenate-serrate leaflets, and small spicate-racemose flowers. Bracts 3-cleft. (Name a corruption of *Argemone*.)

a. Fruiting calyx more or less top-shaped, deeply furrowed *b.*
  b. Leaflets (exclusive of the little intermediate ones) chiefly 5–9, ovate to obovate or elliptic-oblong.
    Rhachis of inflorescence covered with minute glandular puberulence interspersed with long widely spreading hairs; leaves sparingly pubescent beneath; roots not thickened . . . . . 1. *A. gryposepala*
    Rhachis appressed-villous or glandular-puberulent, without long widely spreading hairs.
      Roots not thickened; lower surface of leaflets conspicuously resinous-dotted, only the veins villous . . . . . 2. *A. striata.*
      Roots fusiform-thickened toward the end; lower surface of leaflets velvety-tomentose, scarcely or not at all resinous-dotted.
        Larger leaflets 5–9, oblong or elliptical; fruiting calyx 4–5 mm. wide (exclusive of spreading hooks) . . . . . 3. *A. mollis.*
        Larger leaflets 3–5, obovate; fruiting calyx about 3 mm. wide (exclusive of hooks) . . . . . 4. *A. microcarpa.*
  b. Leaflets (exclusive of little intermediate ones) 11–13, lanceolate to narrowly lance-oblong . . . . . 5. *A. parviflora.*
a Fruiting calyx hemispherical, striped but scarcely furrowed . . . 6. *A. rostellata.*

1. **A. gryposépala** Wallr. Tall (7–12 dm.); stem hirsute; leaflets large, thin, smoothish, scarcely paler beneath; fruiting calyx nearly 1 cm. long; *hooks long, widely spreading, the outer deflexed.* (*A. Eupatoria* Man. ed. 6, in part, not L.; *A. hirsuta* Bicknell.) — Thickets, ravines, etc., s. N. S. and centr. Me. to Va., and westw.; frequent.

2. **A. striàta** Michx. Erect, subsimple up to the inflorescence, 3–15 dm. high, softly pubescent, the hairs inclining to be appressed; leaflets mostly narrowed to a point, somewhat costate; fruiting-calyx strongly deflexed; the *hooks relatively short and connivent or scarcely spreading.* (*A. Eupatoria* Man. ed. 6, in part, not L.; *A. Brittoniana* Bicknell.) — Damp woods, alluvial soil, etc., Nfd. to Sask., s. to W. Va., Ill., Neb., S. Dak., and N. Mex. (Eurasia.)

3. **A. móllis** (T. & G.) Britton. *Grayish-pubescent*, 6–15 dm. high; *leaflets oblong*, mostly obtuse, *soft to the touch on both surfaces;* fruit broadly top-shaped, the hooks borne on a broad disk, the outer widely spreading. (*A. pubescens* Wallr. ?) — Open woods, dry ground, etc., Mass. to N. C., and westw.

4. **A. microcárpa** Wallr. Small, subsimple, mostly 3–5 dm. high; *leaflets obovate, soft-tomentose beneath*, sparingly appressed-pubescent or subglabrous above; fruiting calyx much as in the last but smaller. (*A. pumila* Muhl., inadequately characterized.) — Woods, etc., Pa. to Fla. and Tex.

5. **A. parviflòra** Ait. *Stem hirsute*, 7–12 dm. high, leafy; *leaflets numerous*, narrow, with many smaller intermediate ones of 2 or 3 different sizes; fruiting calyx small (4–5 mm. long), abruptly deflexed at maturity from an ascending pedicel; *outer hooks widely spreading.* — Chiefly in sandy and alluvial soil, Ct. to Ga., westw. to Ont., Kan., and La.

6. **A. rostellàta** Wallr. Slender, 4–8 dm. high; *stem nearly glabrous*, roughish; leaflets few, obovate; fruiting calyx small, *almost hemispherical, not deeply furrowed*, the hooks small, the longest shorter than the connivent calyx-lobes. (*A. striata* Bicknell, not Michx.) — Rocky woods, alluvium, etc., Ct. to Ga., and Westw.

22. SANGUISÓRBA [Rupp.] L. Burnet

Calyx with a top-shaped tube, constricted at the throat, persistent; the 4 broad petal-like spreading lobes imbricated in the bud, deciduous. Petals none. Stamens 4–12 or more, with flaccid filaments and short anthers. Pistils 1–3; the slender terminal style tipped with a tufted or brush-like stigma. Achene (commonly solitary) inclosed in the 4-angled dry and thickish calyx-tube. Seed suspended. — Chiefly perennial herbs, with unequally pinnate leaves, stipules adherent to the petiole, and small often polygamous or dioecious flowers crowded in a dense head or spike at the summit of a long and naked peduncle, each bracteate and 2-bracteolate. (Name from *sanguis*, blood, and *sorbere*, to drink up, to absorb, from reputed styptic properties in folk-medicine.) Poterium L., in part.

* *Stamens* 4; *leaflets* 2–5 *cm. long.*

1. **S. canadénsis** L. (Canadian B.) Stamens long-exserted, club-shaped, *white, as is* the whole of *the elongated and cylindrical spike;* stem 3–16 dm. high; leaflets numerous, ovate or oblong-lanceolate, coarsely serrate, obtuse, heart-shaped at base, as if stipellate; stipules serrate. (*Poterium* Gray.) — Bogs and wet meadows, Lab. to mts. of Ga., w. to Mich.

2. **S. officinàlis** L. In habit similar to the preceding; *spikes* dense, *ovoid, brownish- or purplish-red.* — Established in low fields near coast of Me.; also reported from Minn. (Adv. from Eurasia.)

** *Stamens numerous; leaflets* 8–15 *mm. long.*

3. **S. mìnor** Scop. (Garden B.) Stamens 12 or more in the lower flowers of the globular greenish head, with drooping capillary filaments, the upper flowers pistillate only; stems 3–5 dm. high; leaflets small, ovate, deeply cut. (*Poterium Sanguisorba* L.) — Locally established in grassy places, cultivated grounds, etc., Me. to Md. and w. N. Y. (Adv. from Eurasia.)

23. RÒSA [Tourn.] L. Rose

Calyx-tube urn-shaped, contracted at the mouth, becoming fleshy in fruit. Petals 5, obovate or obcordate, inserted with the many stamens into the edge of the hollow thin disk that lines the calyx-tube and within bears the numerous

pistils below. Ovaries hairy, becoming bony achenes in fruit. — Shrubs, usually prickly, with odd-pinnate leaves, and stipules adnate to the petiole; stalks, foliage, etc., often bearing aromatic glands. Many of the species highly variable and often indeterminable from imperfect specimens. (The ancient Latin name.)

a. Styles coherent in a protruding column, as long as the stamens . . 1. *R. setigera.*
a. Styles distinct *b.*
b. Sepals connivent after flowering, persistent; pedicels and receptacle naked *c.*
c. Prickles scattered or none, the infra-stipular when present not enlarged.
Leaf-rhachis glandular-puberulent or -bristly.
Fruit pyriform, obovoid or oblong, top-shaped at base . . 2. *R. acicularis.*
Fruit subglobose, obtuse or rounded at base (2) *R. acicularis*, v. *Bourgeauiana*
Leaf-rhachis softly and finely villous or tomentulose; glandular hairs merely occasional or none.
Prickles numerous, scattered; leaflets 7–11 . . . . . 3. *R. pratincola.*
Prickles occasionally present on main stem but mostly few or none; leaflets 5–7 . . . . . 4. *R. blanda.*
c. Prickles not wholly uniform, the infra-stipular somewhat stouter.
Calyx-lobes essentially entire.
Calyx-lobes 1–1.5 cm. long.
Leaves 6–10 cm. long; leaflets pubescent beneath; stem armed chiefly near the nodes . . . . . 5. *R. Woodsii.*
Leaves 2–4 cm. long; leaflets essentially glabrous; stem excessively spiny throughout . . . . . 6. *R. spinosissima.*
Calyx-lobes 2–2.5 cm. long . . . . . 7. *R. cinnamomea.*
Outer calyx-lobes conspicuously pinnatifid . . . . . 8. *R. canina.*
b. Sepals spreading after flowering, deciduous from the mature fruit; receptacle and pedicels more or less hispid or tomentose.
Leaflets thick, evergreen or nearly so; receptacle tomentose . . 9. *R. bracteata.*
Leaflets membranaceous; receptacle not tomentose.
Leaf-rhachis very glandular.
Prickles strong, hooked; leaflets rarely 2 cm. long . . . 10. *R. rubiginosa.*
Prickles weak, acicular, often gland-tipped; leaflets 3–6 cm. long . . . . . 11. *R. gallica.*
Leaf-rhachis puberulent or glabrous, scarcely if at all glandular.
Young growth densely covered, even into the inflorescence, with needle-like prickles . . . . . 12. *R. nitida.*
Young growth armed at the nodes or not at all.
Stipules narrowly linear, their free auricles merely short-lanceolate teeth; leaflets serrulate; infra-stipular prickles short, 2–4 (rarely 6) mm. long, broad-based and decidedly curved . . . . . 13. *R. carolina.*
Stipules more dilated, oblanceolate, their auricles somewhat deltoid; serratures of the leaflets coarser and deeper; infra-stipular prickles longer.
Prickles decidedly curved; leaflets somewhat shining above 14. *R. virginiana.*
Prickles straight or nearly so; leaflets dull above . . 15. *R. humilis.*

1. R. setígera Michx. (Climbing or Prairie R.) *Stems climbing*, armed with stout nearly straight scattered prickles, not bristly; leaflets 3–5, ovate, acute, sharply serrate, smooth or downy beneath; stalks and calyx glandular, flowers corymbed; sepals pointed; petals deep rose-color changing to white, fruit globular. — Borders of prairies and thickets, Ont. to Fla., w. to Wisc., Neb., and Tex.; also an escape from cultivation in Ct. July. — Strong shoots growing 3–6 m. in a season.

2. R. aciculàris Lindl. *Stems* 3–12 dm. high, *very prickly; stipules usually dilated*, glandular-ciliate and resinous; *leaflets* 3–7, broadly elliptical to oblong-lanceolate, *sessile and obtuse or subcordate at base*, usually pale and somewhat resinous-puberulent beneath, the *teeth serrulate;* flowers large, solitary (very rarely 2–3); outer sepals usually with 1–2 narrow lateral lobes, not hispid; fruit obovoid or ellipsoid, top-shaped at base. (*R. Engelmanni* Wats.) — Sandy thickets, L. Huron to Minn., Col., and Ida. (Siber.)

Var. Bourgeauiàna Crépin. *Fruit globose*, rounded at base; leaves sometimes smoothish but more often soft-pubescent and resinous-pulverulent beneath. — Ledges, rocky woods, etc., Anticosti to s. Vt., n. Mich., centr Ill., Col., and northw.

3. R. pratíncola Greene. *Stems* low, *very prickly; stipules narrow*, more or less glandular-toothed above (or even glandular-ciliate); *leaflets* 7–11, broadly elliptical to oblong-oblanceolate, *subcuneate at base*, somewhat firm and strongly

veined, *simply toothed, not resinous;* flowers corymbose; *sepals rarely hispid, the outer lobed.* (*R. arkansana* of auth., not Porter.) — Prairies, etc., Man. to Mont., s. to Mo. and Tex.

4. R. blánda Ait. Stems 3–15 dm. high, wholly unarmed or occasionally covered with numerous prickles; *stipules dilated*, naked and entire or slightly glandular-toothed; *leaflets* 5–7, usually oblong-lanceolate, thinner and less strongly veined than in the preceding, *cuneate at base and petiolulate, simply serrate, not resinous;* flowers usually large, corymbose or solitary; *sepals hispid, entire.* — On rocks and shores, Nfd. to N. E., and westw. chiefly in the region of the Great Lakes to Mo. and Assina.

5. R. Woódsii Lindl. Stems usually low (1–9 dm. high), with slender straight or recurved prickles, or wholly unarmed above; *leaflets* 5–7, *obovate to oblong or lanceolate*, more or less toothed; flowers corymbose or solitary; sepals naked or hispid, the outer usually lobed; fruit globose, with a short neck. — Minn. to Mo., westw. and northwestw.

6. R. SPINOSÍSSIMA L. (SCOTCH R.) Low spreading shrub; stems densely covered with long straightish prickles and innumerable shorter ones; *leaflets* 7–13, *small, broadly elliptic to suborbicular*, glabrous or nearly so; stipules very small; fruit globular, black. — Often cultivated, and inclined to spread from old gardens, N. E., Ont., etc. (Introd. from Eurasia.)

7. R. CINNAMÒMEA L. (CINNAMON R.) Stems flexuous, reddish brown, armed with pairs of light-colored broad-based slightly recurved infra-stipular prickles; *leaflets* rather *narrowly elliptical*, 2–3 cm. long, paler beneath, sharply and finely serrate; flowers commonly double. — Once much cultivated, and now established in hedgerows, etc. (Introd. from Eurasia.)

8. R. CANÌNA L. (DOG R.) Stems armed with stout recurved prickles, the branches sometimes unarmed; *leaflets* 5–7, *elliptical or oblong-ovate*, glabrous or somewhat pubescent, simply toothed, *not resinous-puberulent;* flowers solitary (or 2–4) on usually naked pedicels; *sepals pinnatifid;* fruit ovoid or nearly globular. — A casual escape from cultivation, Mass. to Tenn.; thoroughly naturalized on river-banks in Pa. (*Porter*). (Introd. from Eurasia.)

9. R. BRACTEÀTA Wendl. (MACARTNY R.) *Leaflets* mostly 7, *narrowly obovate*, rounded at the apex, thick, shining, *evergreen*, glabrous; flowers large; *calyx densely villous-tomentose;* petals mostly white. — Cultivated from China, extensively naturalized in parts of the Southern States, extending to Va. (Introd. from Asia.)

10. R. RUBIGINÒSA L. (SWEETBRIER, EGLANTINE.) Armed with strong hooked mostly infra-stipular prickles (with or without scattered smaller ones); *leaflets densely resinous beneath and aromatic, doubly serrate;* the short pedicels and pinnatifid sepals hispid; flowers pink, mostly 3–4 cm. in diameter; fruit obovate. — Rocky pastures, etc., common. (Introd. from Eu.)

Var. MICRÁNTHA (Sm.) Liudl. Leaves less glandular, nearly scentless, flowers smaller (about 2–2.5 cm. in diameter) and paler; fruit somewhat flask-shaped. — Along roadsides, etc., e. Mass. (Introd. from Eng.) — Inconstant and suggesting relationship to no. 8.

11. R. GÁLLICA L. Erect, 1–1.6 m. high; stem glandular-hispid and armed with straightish slender prickles; *leaflets* 3–5, *broadly elliptic, cordate* at base, rounded or obtusish at apex, *doubly glandular-serrate;* flowers large, mostly deep red and double. — Often cultivated, and now well established in roadside thickets, N. E., O., and probably elsewhere. (Introd. from Eu.)

12. R. nítida Willd. Low, nearly or quite *glabrous throughout, the straight slender infra-stipular prickles scarcely stouter than those which usually thickly cover the stem and branches; stipules mostly dilated;* leaflets bright green and shining, usually narrow-oblong and acute at each end; flowers solitary (rarely 2–3); *sepals entire.* — Margins of swamps, Nfd. to N. E.

13. R. carolìna L. Stems usually tall (3–25 dm. high), with stout straight or usually more or less curved prickles; stipules long and very narrow; *leaflets* 5–9 (mostly 7), *finely serrate*, dull green, usually narrow-oblong and acute at each end and petiolulate, but often broader, usually pubescent beneath. — Borders of swamps and streams, N. S. to Fla., w. to Minn. and Miss.

14. **R. vírginiàna** Mill. Stems often tall and stout (2–20 dm. high), *with at length stout and usually more or less hooked prickles; stipules* usually naked, *more or less dilated; leaflets* (mostly 7) dark green, rather thick, *smooth and often shining above;* flowers corymbose or solitary; outer sepals frequently with 1 or 2 small lobes. (*R. lucida* Ehrh.) — Margins of swamps and rocky shores, Nfd. and e. Que. to N. Y. and e. Pa.

15. **R. hùmilis** Marsh. Stems usually low (3–9 dm. high), slender, with *straight slender prickles* (spreading or sometimes reflexed); *stipules narrow,* rarely somewhat dilated; leaflets as in the last, but usually thinner and duller; flowers very often solitary; *outer sepals always more or less lobed.* — Mostly in dry soil or on rocky slopes, N. S. to Fla., w. to Minn., Mo., Okla., and La.

24. PRÙNUS [Tourn.] L. Plum, Cherry, etc.

Calyx 5-cleft; the tube bell-shaped, urn-shaped, or tubular-obconical, deciduous after flowering. Petals 5, spreading. Stamens 15–20. Pistil solitary, with 2 pendulous ovules. Drupe fleshy, with a bony stone. — Small trees or shrubs, with mostly edible fruit. (The ancient Latin name.) Cerasus B. Juss. Amygdalus L.

a. Ovary glabrous; stone smoothish or shallowly sculptured *b.*
- *b.* Flowers racemose; pedicels much shorter than the floriferous part of the rhachis.
  - Leaves oblong, thickish, crenate-serrulate, the teeth incurved . 1. *P. serotina.*
  - Leaves mostly obovate, thin, sharply serrate; teeth somewhat spreading . . . . . 2. *P. virginiana.*
- *b.* Flowers umbellate or, if racemose, with pedicels exceeding the floriferous part of the rhachis *c.*
  - *c.* Flowers small; petals mostly 4–6 mm. long *d.*
    - *d.* Leaves broad or, if narrow, serrulate practically to the base *e.*
      - *e.* Leaves lanceolate to oblong, ovate, or obovate *f.*
        - *f.* Petioles tomentose at least on the upper side.
          - Leaves lanceolate, attenuate.
            - Petioles 15–38 mm. long . . . . . 15. *P. hortulana.*
            - Petioles 5–8 mm. long . . . . . 4. *P. alleghaniensis.*
          - Leaves ovate- or obovate-oblong to elliptical.
            - Leaves obovate, thinnish, mostly cuneate at base, 1–2.5 cm. wide, somewhat doubly serrate; pedicels 1–3 in a fascicle . . . . . 5. *P. instititia.*
            - Leaves ovate- or obovate-oblong, thickish, rugose, mostly obtuse at base, usually 3–4 cm. broad, simply serrate; pedicels 2–6 in a fascicle . . . 6. *P. maritima.*
        - *f.* Petioles essentially glabrous.
          - Teeth of the ovate-lanceolate mostly falcate-acuminate leaves unequal . . . . . 3. *P. pennsylvanica*
          - Teeth of the lance-elliptical acute or obtusish leaves equal 7. *P. angustifolia.*
      - *e.* Leaves suborbicular, rounded or subcordate at base.
        - Teeth of leaves fine, obtuse; the sinuses glandular . . 8. *P. Mahaleb.*
        - Teeth of leaves coarser, bristle-tipped; the sinuses not glandular . . . . . 9. *P. Gravesii.*
    - *d.* Leaves relatively narrow, spatulate-linear or -oblong, subentire at the cuneate base.
      - Erect shrub; leaves spatulate-oblong . . . . . 10. *P. cuneata.*
      - Prostrate; leaves linear- or oblanceolate-spatulate . . . 11. *P. pumila.*
  - *c.* Flowers large; petals 8–16 mm. long.
    - Teeth of leaves obtusish, some or all glandular.
      - Calyx-lobes entire or nearly so
        - Inner scales of the flowering buds subherbaceous, ligulate, spreading . . . . . 12. *P. avium.*
        - Inner scales not very unlike the outer, subappressed . . 13. *P. Cerasus.*
      - Calyx-lobes conspicuously glandular-serrulate.
        - Leaves thin, obovate; petals 12–14 mm. long . . . 14. *P. nigra.*
        - Leaves thickish, firm in texture; petals about 8 mm. long . 15. *P. hortulana.*
    - Teeth of leaves acute or acuminate, bristle-tipped, not glandular 16. *P. americana.*

a. Ovary and fruit velvety-tomentose; stone deeply sculptured and pitted 17. *P. Persica.*

§ 1. PÀDUS [L.] Reichenb. *Drupe small, globose, without bloom; the stone turgid-ovate, marginless; flowers in racemes terminating leafy branches, therefore appearing after the leaves, late in spring.* Padus Moench.

1. **P. serótina** Ehrh. (Wild Black or Rum C.) A large tree, with reddish-brown branches, *the inner bark aromatic; leaves oblong or lanceolate-oblong.*

taper-pointed, serrate with incurved short and callous teeth, thickish, shining above; racemes elongated; petals obovate; fruit purplish-black. — Woods, N. S. to Fla., w. to Dak. and Ariz. — Fruit slightly bitter, but with a pleasant vinous flavor.

2. **P. virginiàna** L. (CHOKE C.) A tall shrub or small tree, with grayish *bark*, the inner layers *with a rank disagreeable odor; leaves oval, oblong, or obovate, abruptly pointed, very sharply (often doubly) serrate with slender teeth*, thin; petals roundish; fruit red turning to dark crimson, austere and astringent; stone smooth. — Nfd. to Ga., and westw. Var. LEUCOCÁRPA Wats., with short dense racemes and sweeter yellowish fruit, has been found at Dedham, Mass.

§ 2. PRUNÓPHORA (Neck.) Endl. *Drupe smooth; the stone smooth or somewhat rugged; flowers (usually white) from separate lateral scaly buds in early spring, preceding or developing with the leaves; pedicels few or several in simple umbel-like clusters.*

3. **P. pennsylvánica** L. f. (WILD RED, BIRD, FIRE OR PIN C.) Tree, 6–10 m. high, with light red-brown bark; *leaves oblong-lanceolate, pointed, finely and sharply serrate, shining, green and smooth both sides;* flowers many in a cluster, on long pedicels; fruit globose, light red, very small, with thin and sour flesh; stone globular. — Rocky woods and recent clearings, Lab. to B. C., s. to Pa., Great L. region, centr. Ia., and along the mts. to N. C., Tenn., and Col.

4. **P. alleghaniénsis** Porter. (SLOE.) A low straggling shrub or small tree (1–5 m. high), seldom thorny; *leaves lanceolate to oblong-ovate, often long-acuminate, finely and sharply serrate*, softly pubescent when young, glabrate with age; *fruit globose-ovoid, very dark purple, with a bloom*, less than 12 mm. in diameter; stone turgid, a shallow groove on one side and a broad flat ridge on the other. — Thickets, s. Ct. (*Eames, Graves*) to the Allegheny Mts. of Pa.

5. **P. INSTITÍTIA** L. (BULLACE P.) Somewhat thorny; *leaves obovate*, mostly obtusish at the apex and narrowed at base, sharply and somewhat doubly serrate, soft-pubescent beneath; fruit small, globular, black, with a bloom. (*P. spinosa*, var. Gray.) — Roadsides and waste places, N. E. and perhaps occasionally in the Middle States. (Adv. from Eurasia.)

6. **P. marítima** Wang. (BEACH P.) Low and straggling (3–15 dm. high); *leaves ovate or oval, finely serrate, softly pubescent underneath;* pedicels short, pubescent; fruit globular, purple or crimson (rarely paler), with a bloom, 13–25 mm. in diameter; the *stone* very turgid, *acute on one edge*, rounded and minutely grooved on the other. — Sea-beaches, dunes, etc., s. Me. to Va.

7. **P. angustifòlia** Marsh. (CHICKASAW P.) Scarcely thorny, 2–5 m. high; leaves membranaceous, elliptic-lanceolate, finely serrulate, glabrous; fruit globular, red, nearly destitute of bloom, thin-skinned, 12–16 mm. in diameter; the ovoid *stone* almost as thick as wide, *rounded at both sutures*, one of them minutely grooved. (*P. Chicasa* Michx.) — Del. to Fla., and westw. to Tex. and Kan.

Var. **Watsòni** (Sarg.) Waugh. (SAND P.) Dwarf (1–1.3 m. high); stems much branched and somewhat rigid; leaves smaller and rather firm in texture; fruit small, red, thick-skinned. (*P. Watsoni* Sarg.) — Kan. and Neb.

8. **P. MÀHALEB** L. (PERFUMED C.) Shrub or small tree (7 m. high), *glabrous or nearly so; leaves ovate-orbicular*, short-pointed or obtuse, slender-petioled, crenulate-denticulate, glandular between the teeth; flowers corymbose; fruit ovoid to subglobose, black or nearly so, 7–10 mm. long. — Roadsides, river-banks, open woods, etc., spreading from cultivation, Ct. to Del., and westw. (Introd. from s. Eu.)

9. **P. Gravèsii** Small. Unarmed shrub, 1–1.3 m. high; *leaves obovate-orbicular, finely pubescent* on both surfaces, serrate-dentate, rounded or even retuse at the apex, 2–3 cm. in diameter; flowers 1–3 in a fascicle, the pedicels pubescent; fruit globose, bluish-black, 12–15 mm. in diameter; *stone* about 9 mm. long, *subglobose but with one sharp edge.* — Gravelly ridge, Groton, Ct. (*Graves.*)

10. **P. cuneàta** Raf. Low *erect* shrub, obscurely puberulent to entirely

glabrous; *leaves spatulate-oblong or* more rarely *lance-oblong*, obtuse or acute, serrate above the middle, entire toward the cuneate base, pale beneath; flowers 2–4 in a fascicle; fruit globose, without bloom, nearly black, about 1 cm. in diameter. (*P. pumila*, var. Bailey.) — Thickets, sandy soil, s. Me. to N. C. and Minn.

11. **P. pùmila** L. (Sand C.) *Prostrate*, spreading and creeping; *leaves linear-spatulate to oblanceolate*, usually acute or acutish, pale beneath, subentire or toothed above the middle; flowers as in the preceding; fruit globose, pendulous, dark claret-color, without bloom, about 1 cm. in diameter. — Sandy and rocky shores, e. Que. to Pa., n. Ind., Wisc., and Man.

12. **P.** Avium L. (Sweet C., Mazzard.) Tree of pyramidal form and reddish-brown bark; flowers large; petals mostly 12–15 mm. long; inner *bud-scales* at the base of the pedicels *greenish*, *large*, *widely spreading*, very hairy on the inner surface and conspicuously glandular-serrate; fruit depressed-globose, yellow or red, sweet and juicy. — Often escaping from cultivation and forming thickets in hedgerows, etc. (Introd. from Eurasia.)

13. **P.** Cérasus L. (Sour or Morello C.) Tree of lower growth and rounder head than the preceding; bark gray; flowers as in the preceding but inner *bud-scales small*, *not conspicuously spreading;* fruit depressed-globose, red, acid. — Commonly cultivated, and occasionally escaping to hedgerows, woods, etc. (Introd. from s. Eu.)

14. **P. nìgra** Ait. (Wild or Canada P.) Shrub or small tree (2–8 m. high), armed; *leaves* thin, *broadly obovate*, subcaudately acuminate, doubly *crenate-serrate*, the *teeth* usually *gland-tipped;* petioles mostly with 2 glands at the summit; calyx-lobes glandular-serrate, glabrous within; petals white, broadly obovate, 12–14 mm. long; fruit orange-red or yellow, 2.5 cm. long, compressed-ovoid to subglobose, almost without bloom. — River-banks and roadside thickets, Nfd. to s. N. E. and westw. along the Great Lakes.

15. **P. hortulàna** Bailey. (Wild Goose P.) Small unarmed tree; *leaves ovate- or lance-oblong*, caudate-acuminate, glabrous on both surfaces, at maturity 9–15 cm. long, rounded at base, finely and somewhat unevenly *crenate-serrate;* the *teeth mostly gland-tipped;* flowers 2–4 in a fascicle; pedicels glabrous; calyx-lobes glandular-serrate; petals obovate, about 8 mm. long; fruit globular, thin-skinned, light yellow to red. — Rich bottom lands, Ill. and Mo.

16. **P. americàna** Marsh. (Wild P.) Tree, 3–10 m. high, armed; *leaves* rather *narrowly obovate*, long-acuminate, *sharply* and doubly *serrate*, the *teeth not glandular;* petioles with or without glands; petals narrowly obovate, about 1 cm. long; calyx-lobes entire, hairy on the inner surface; fruit subglobose, becoming red at full maturity, about 2 cm. in diameter. — River-banks and borders of woods, Ct. to Fla., and westw. to Col.

Var. **móllis** T. & G. Leaves permanently soft-pubescent or tomentose beneath. — Ia. to La. and Tex.

§ 3. AMÝGDALUS (L.) B. & H. *Drupe velvety-tomentose; the stone deeply sculptured and pitted; flowers subsessile, from a scaly bud, opening before the leaves appear; the latter conduplicate in bud.* Amygdalus [Tourn.] L. Persica [Tourn.] Borkh.

17. **P.** Pérsica (L.) Stokes. (Peach.) Small tree; leaves lance-oblong, attenuate, serrate; flowers pink; fruit subglobose. (*Amygdalus* L.) — Abundantly cultivated, and tending to become established in thickets, etc., N. Y. and southw. (Introd. from Asia.)

LEGUMINÒSAE (Pulse Family)

Plants with papilionaceous or sometimes regular flowers, 10 (*rarely* 5 *and sometimes many*) *monadelphous*, *diadelphous*, *or rarely distinct stamens*, *and a single simple free pistil becoming a legume in fruit. Seeds mostly without albumen. Leaves alternate*, *with stipules*, *usually compound.* One of the

sepals inferior (*i.e.* next the bract); one of the petals superior (*i e.* next the axis of the inflorescence). — A very large family.

Subfamily I. MIMOSOÍDEAE

Flowers regular, small. Corolla valvate in aestivation, often united into a 4–5-lobed cup, hypogynous, as are the (often very numerous) exserted stamens. Embryo straight. Leaves twice pinnate.

* Stamens numerous.

1. **Acacia**. Filaments distinct. Pod and stem (in ours) unarmed.
2. **Abizzia**. Filaments united into a tube at base. Unarmed shrubs or trees.

* * Stamens 5–10.

3. **Desmanthus**. Petals distinct. Stamens 5 or 10. Pods smooth, flat. Herbaceous or nearly so.
4. **Schrankia**. Petals united below into a cup. Stamens 8 or 10. Pod covered with small prickles or rough projections.

Subfamily II. CAESALPINIOÍDEAE

Corolla imperfectly or not at all papilionaceous, sometimes nearly regular, imbricated in the bud, the upper or odd petal inside and inclosed by the others. Stamens 10 or fewer, commonly distinct, inserted on the calyx. Seeds anatropous, often with albumen. Embryo straight.

* Flowers not at all papilionaceous, polygamous or dioecious; trees.

5. **Gymnocladus**. Unarmed. Leaves doubly pinnate. Calyx-tube elongated, at its summit bearing 5 petals resembling the calyx-lobes. Stamens 10.
6. **Gleditsia**. Thorny. Leaves simply and doubly pinnate. Calyx-tube short; its lobes, as well as the petals and stamens, 3–5.

* * Flowers not at all papilionaceous, perfect; calyx 5-parted; herbs.

7. **Cassia**. Leaves simply and abruptly pinnate.

* * * Flowers imperfectly papilionaceous, perfect; trees.

8. **Cercis**. Calyx campanulate, 5-toothed. Pod flat, wing-margined. Leaves simple.

Subfamily III. PAPILIONOÍDEAE

Calyx of 5 sepals, more or less united, often unequally so. Corolla inserted into the base of the calyx, of 5 irregular petals (or very rarely fewer), more or less distinctly *papilionaceous*, *i.e.* with the upper or odd petal (*vexillum* or *standard*) larger than the others and inclosing them in the bud, usually turned backward or spreading; the two lateral ones (*wings*) oblique and exterior to the two lower, which last are connivent and commonly more or less coherent by their anterior edges, forming the *carina* or *keel*, which usually incloses the stamens and pistil. Stamens 10, very rarely 5, inserted with the corolla, monadelphous, diadelphous (mostly with 9 united into a tube which is cleft on the upper side, and the tenth or upper one separate), or occasionally distinct. Ovary 1-celled, sometimes 2-celled by an intrusion of one of the sutures, or transversely 2–many-celled by cross-division into joints; style simple; ovules amphitropous, rarely anatropous. Cotyledons large, thick or thickish; radicle incurved. — Leaves simple or simply compound, the earliest ones in germination usually opposite, the rest alternate; leaflets almost always quite entire. Flowers perfect.

I. Stamens (10) distinct.

* Leaves palmately 3-foliolate or simple; calyx 4-5-lobed; herbs.

9. **Baptisia.** Pod inflated.
10. **Thermopsis.** Pod flat, linear.

* * Leaves pinnate; calyx-teeth short.

11. **Cladrastis.** Flowers panicled, white. Pod flat. A tree.
12. **Sophora.** Flowers racemose, white. Pod terete, moniliform. Herbaceous.

II. Stamens monadelphous, or diadelphous (9 and 1, rarely 5 and 5), nearly distinct in no. 25.

* Anthers of two forms; stamens monadelphous; leaves digitate, simple, or rarely phyllodial.

+ Calyx 5-lobed; pod inflated.

13. **Crotalaria.** Herbs with simple leaves.

+ + Calyx 2-lipped; pod flat.

++ Shrubs with simple leaves.

14. **Genista.** Seeds estrophiolate. Corolla yellow.

++ ++ Shrubs with 1–3-foliate leaves.

15. **Cytisus.** Seeds strophiolate. Corolla yellow.

++ ++ ++ Shrubs; leaves reduced to pungent petioles.

16. **Ulex.** Seeds strophiolate. Corolla yellow.

++ ++ ++ ++ Herbs; leaves (in ours) 7–11-foliolate.

17. **Lupinus.** Seeds estrophiolate. Corolla (in ours) blue, roseate, or rarely white.

* * Anthers uniform (except in nos. 24 and 40).

+ Leaves digitately (rarely pinnately) 3-foliolate; leaflets denticulate or serrulate; stamens diadelphous; pods small, 1-few-seeded, often inclosed in the calyx or curved or coiled.

18. **Trifolium.** Flowers capitate. Pods membranaceous, 1–6-seeded. Petals adherent to the stamen-tube.
19. **Melilotus.** Flowers racemed. Pod coriaceous, wrinkled, 1–2-seeded.
20. **Medicago.** Flowers racemed or spiked. Pods curved or coiled, 1-few-seeded.

+ + Leaves unequally pinnate (or digitate in no. 24); leaflets entire; pod not jointed; neither twining nor climbing (except in no. 31).

++ Herbage not resinous-dotted; flowers umbellate, loosely capitate or solitary and axillary; herbs.

= Filaments all connate.

21. **Anthyllis.** Leaves odd-pinnate (the basal sometimes 1-foliolate). Flowers loosely capitate. Pod subindehiscent, included in the calyx.

= = One filament free, the others connate.

22. **Hosackia.** Leaflets (in ours) 1–3. Flowers (in ours) solitary on leafy-bracted peduncles.
23. **Lotus.** Leaflets (in ours) 5, the lower pair simulating foliaceous stipules. Flowers (in ours) umbellate.

++ ++ Herbage glandular-dotted; stamens mostly monadelphous; pod small, indehiscent, mostly 1-seeded; leaves pinnate (except in no. 24).

24. **Psoralea.** Corolla truly papilionaceous. Stamens 10, half of the anthers often smaller or less perfect. Leaves mostly palmate, 3–5-foliolate.
25. **Amorpha.** Corolla of one petal! Stamens 10, monadelphous at base.
26. **Dalea.** Corolla imperfectly papilionaceous. Stamens 9 or 10; the cleft tube of filaments bearing 4 of the petals about its middle.
27. **Petalostemum.** Corolla scarcely at all papilionaceous. Stamens 5; the cleft tube of filaments bearing 4 of the petals on its summit.

++ ++ ++ Herbage not glandular-dotted (except in no. 34); stamens mostly diadelphous; pod 2-valved, several-seeded; leaves pinnately several-foliolate; flowers racemose.

= Wings cohering with the keel; pod flat or 4-angled; hoary perennial herbs.

28. **Tephrosia.** Standard broad. Pod flat. Leaflets pinnately veined.

= = Flowers large and showy; standard broad; wings free.

29. **Sesbania.** Leaves even-pinnate. Ours herbs.
30. **Robinia.** Pod flat, thin, margined on one edge. Trees or shrubs.
31. **Wisteria.** Pod tumid, marginless. Woody twiners. Leaflets obscurely stipellate.

= = = Standard narrow, erect; pod turgid or inflated; perennial herbs.

32. **Astragalus.** Keel not tipped with a point or sharp appendage. Pod with one or both the sutures turned in, sometimes dividing the cell lengthwise into two.
33. **Oxytropis.** Keel tipped with an erect point; otherwise as *Astragalus*.
34. **Glycyrrhiza.** Flowers, etc., of *Astragalus*. Anther-cells confluent. Pod prickly or muricate, short, nearly indehiscent.

+ + + Herbs; no tendrils; pod transversely 2-several-jointed, the reticulated 1-seeded joints indehiscent, or sometimes reduced to one such joint.

++ Leaves pinnate, with several leaflets, not stipellate.

35. **Aeschynomene.** Stamens equally diadelphous (5 and 5). Calyx 2-lipped. Pod several-jointed; joints square.
36. **Coronilla.** Stamens unequally diadelphous (9 and 1). Calyx 5-toothed. Joints subcylindric, 4-angled. Flowers umbellate.
37. **Hedysarum.** Stamens unequally diadelphous (9 and 1). Calyx 5-cleft. Pod several-jointed; joints roundish.

++ ++ Leaves pinnately 3-foliolate, rarely 1-foliolate.

38. **Desmodium.** Stamens diadelphous (9 and 1) or monadelphous below. Calyx 2-lipped. Pod several jointed. Flowers all of one sort and complete. Leaflets stipellate.
39. **Lespedeza.** Stamens diadelphous (9 and 1); anthers uniform. Pod 1–2-jointed. Flowers often of 2 sorts, the more fertile ones apetalous. Leaflets not stipellate.
40. **Stylosanthes.** Stamens monodelphous; anthers of 2 sorts. Pod 1–2-jointed. Calyx deciduous, the tube narrow and stalk-like. Leaflets not stipellate.

++ ++ ++ Leaves digitately 2- or 4-foliolate.

41. **Zornia.** Flowers spicate, each enveloped by 2 veiny leaf-like bracts.

+ + + + Herbs with abruptly pinnate leaves, terminated by a tendril or bristle; stamens diadelphous; pod continuous, 2-valved, few–several-seeded.

42. **Vicia.** Wings coherent with the keel. Style filiform, bearded with a tuft or ring of hairs at the apex.
43. **Lathyrus.** Wings nearly free. Style somewhat dilated and flattened upwards, bearded down the inner face.

+ + + + + Twining (sometimes only trailing) herbs; leaves pinnately 3(rarely 1 or 5–7)-foliolate; no tendrils; peduncles or flowers axillary; pod not jointed, 2-valved.

++ Leaves pinnately 5–many-foliolate.

44. **Apios.** Herbaceous twiners; leaflets 5–9. Keel slender and much incurved or coiled.

++ ++ Leaves 3-foliolate; ovules and seeds several.

= Style bearded lengthwise on the upper surface.

45. **Phaseolus.** Keel spirally coiled; standard recurved-spreading. Flowers racemose. Corolla (in ours) purple. Seeds round-reniform.
46. **Vigna.** Keel strongly curved but not forming a spiral. Flowers few in peduncular heads or very short racemes. Corolla (in ours) pale yellow.
47. **Strophostyles.** Keel long, strongly incurved but not forming a spiral. Flowers few in peduncular heads. Corolla purple. Seeds oblong, mostly pubescent.
48. **Clitoria.** Keel scythe-shaped; standard spurred at the base, large and showy, pale blue.

= = Style bearded at the summit about the stigma.

49. **Centrosema.** Standard much longer than the other petals. Pod linear, narrow; the valves spirally twisted after dehiscence.
50. **Dolichos.** Standard little exceeding the other petals in length. Pod lunate-oblong; the valves broad, not spirally coiled in dehiscence.

= = = Style beardless.

51. **Amphicarpa.** Calyx tubular, 4–5-toothed. Standard erect; keel almost straight. Some apetalous especially fertile flowers at the base of the plant. Bracts persistent.

52. **Galactia.** Calyx deeply 4-cleft; the upper lobe broadest and entire. Bract and bractlets mostly minute and deciduous.

++ ++ ++ Leaves 1-3-foliolate; ovules and seeds 1-2; flowers yellow.

53. **Rhynchosia.** Keel scythe-shaped. Calyx 4-5-parted. Pod short.

1. ACÂCIA [Tourn.] Mill.

Flowers perfect or polygamous, regular, small, capitate or spicate. Sepals 4–5, nearly distinct or united into a 4–5-toothed campanulate cup. Petals as many, narrow. Stamens ∞, exserted. Pod oblong to linear, compressed or turgid. — Shrubs or trees (mostly armed), with bipinnate or (in certain Australian species) vertically expanded phyllodial leaves. (Ancient Greek name of an Egyptian species.)

1. A. angustíssima (Mill.) Ktze., var. hirta (Nutt.) Robinson. Unarmed hirsute undershrub; pinnae 8–14 pairs and leaflets mostly 18–40 pairs (both less numerous in young shoots); flowers in yellow or salmon-colored paniculate globose heads. (*A. hirta* Nutt.; *A. filicioides* Trel.) — Dry bluffs, McDonald Co., Mo. (*Bush*), Kan. (*Hitchcock*), and southw. — The typical form (*Mimosa angustissima* Mill.) of Mex. has fewer pinnae and more numerous leaflets.

2. ALBÍZZIA Durazzini.

Flowers perfect or polygamous. Calyx tubular, 5-dentate. Petals united for more than half their length into a tubular somewhat salver-formed corolla. Stamens numerous; the filaments much elongated. Pod narrowly oblong, the valves neither twisted nor elastically spreading. — Unarmed trees with bipinnate leaves. (Dedicated to the *Albizzi*, a noble Italian family, one of whom is said to have introduced this genus into European cultivation.)

1. A. JULIBRÍSSIN Durazzini. Flowers in tassel-like clusters at the end of slender naked peduncles. — Frequently cultivated in the Southern States, and locally established as far n. (according to Small) as Va. (Introd. from Asia and Afr.)

3. DESMÁNTHUS Willd.

Flowers perfect or polygamous, regular. Calyx campanulate, 5-toothed. Petals 5, distinct. Stamens 5 or 10. Pod flat, membranaceous or somewhat coriaceous, several-seeded, 2-valved, smooth. — Herbs, with twice-pinnate leaves of numerous small leaflets, and with one or more glands on the petiole, setaceous stipules, and axillary peduncles bearing a head of small greenish-white flowers. (Name composed of δέσμη, *a bundle*, and ἄνθος, *flower*.)

1. D. illinoénsis (Michx.) MacM. Nearly glabrous perennial, erect, 3–24 dm. high; pinnae 6–15 pairs; leaflets 20–30 pairs; peduncles 2.5–7.5 cm. long; stamens 5; *pods numerous in dense globose heads, oblong or lanceolate*, curved, scarcely 2.5 cm. long, 2–6-seeded. (*Mimosa* Michx.; *Acuan* Ktze.; *D. brachylobus* Benth.) — Prairies and alluvial banks, O. and Ky. to S. Dak., Mo., Tex., and Fla.

4. SCHRÂNKIA Willd. SENSITIVE BRIER

Flowers polygamous, regular. Calyx minute, 5-toothed. Petals united into a funnel-form 5-cleft corolla. Stamens 10–12, distinct, or the filaments united at base. Pods long and narrow, rough-prickly, several-seeded, 4-valved, *i.e.* the two narrow valves separating on each side from a thickened margin. — Perennial herbs, nearly related to the true Sensitive Plants (*Mimosa*); the procumbent stems and petioles recurved-prickly, with twice pinnate sensitive leaves of many small leaflets, and axillary peduncles bearing round heads of small rose-colored flowers. (Named for *Franz von Paula von Schrank*, a German botanist, 1747–1835.) MORONGIA Britton.

1. **S. uncinàta** Willd. Prickles hooked; pinnae 4–6 pairs; *leaflets elliptical, reticulated* with strong veins beneath; pods oblong-linear, nearly terete, short-pointed, densely prickly, 5 cm. long. (*Morongia* Britton.) — Dry prairies and open woods, Va. to Fla. and Tex.; northw. in Miss. basin to Ia. and Ill. June, July.

2. **S. angustàta** T. & G. *Leaflets oblong-linear, scarcely veined;* pods slender, taper-pointed, sparingly prickly, 1 dm. long. (*Morongia* Britton.) — Dry sandy soil, s. Va. to Fla., Tenn., and Tex. June–Aug.

5. GYMNÓCLADUS Lam. Kentucky Coffee-tree

Flowers dioecious or polygamous, regular. Calyx elongated-tubular below, 5-cleft. Petals 5, oblong, equal, inserted on the summit of the calyx-tube. Stamens 10, distinct, short, inserted with the petals. Pod oblong, flattened, hard, pulpy inside, several-seeded. Seeds flattish. — A tall unarmed tree, with rough bark, stout branchlets, and large unequally twice-pinnate leaves. Flowers whitish, in terminal racemes. (Name from γυμνός, *naked*, and κλάδος, *a branch*, alluding to the stout branches for many months destitute of spray.)

1. **G. dioíca** (L.) Koch. Leaves 6–9 dm. long, with several large partial leafstalks bearing 7–13 ovate stalked leaflets, the lowest pair with single leaflets; stipules wanting; pod 1.5–2.5 dm. long, 3–4 cm. broad; seeds over 1.3 cm. across. (*G. canadensis* Lam.) — Rich woods, centr. N. Y. and Pa. to Minn., e. Neb., Okla., and Tenn. May, June.

6. GLEDÍTSIA L. Honey Locust

Flowers polygamous. Calyx short, 3–5-cleft, the lobes spreading. Petals as many as the sepals and equaling them, the two lower sometimes united. Stamens 3–10, distinct, inserted with the petals on the base of the calyx. Pod flat, 1–many-seeded. Seeds flat. — Thorny trees, with abruptly once or twice pinnate leaves, and inconspicuous greenish flowers in small spikes. Thorns above the axils. (Simplified and Latinized name of *J. G. Gleditsch*, a botanist contemporary with Linnaeus.)

1. **G. triacánthos** L. (Honey Locust.) Thorns stout, often triple or compound; *leaflets lanceolate-oblong*, somewhat serrate; *pods linear*, elongated (2–4.5 dm. long), often twisted, filled with sweet pulp between the seeds. — Rich woods, w. N. Y. and Pa. to Ga., w. to e. Neb., Kan., and Tex.; common in cultivation, and establishing itself northeastw. May, June.

2. **G. aquática** Marsh. (Water Locust.) Thorns slender, mostly simple; *leaflets ovate or oblong; pods oval, 1-seeded*, pulpless. — Deep swamps, S. C. to Fla. and Tex.; northw. in Miss. basin to Ky., Ind., Ill., and Mo. — A smaller tree, 8–12 m. high

7. CÁSSIA [Tourn.] L. Senna

Sepals 5, scarcely united at base. Petals 5, little unequal, spreading. Stamens 5–10, unequal, and some of them often imperfect, spreading; anthers opening by 2 pores or chinks at the apex. Pod many-seeded, often with cross partitions. — Herbs (in the United States), with simply and abruptly pinnate leaves, and mostly yellow flowers. (An ancient name of obscure derivation.)

* *Leaflets large; stipules deciduous; the three upper anthers deformed and imperfect; flowers in short axillary racemes, the upper ones panicled; herbage glabrous.*

1. **C. marilándica** L. (Wild S.) Root perennial; stem 9–12 dm. high; *stipules linear-setaceous*, caducous; *leaflets 5–9 pairs, lanceolate-oblong, obtuse;* petiole with a *slender club-shaped gland* near the base; *pods* linear, slightly curved, *flat*, at first hairy, 6.5–11 cm. long, *their segments as long as broad, seed flat, quadrate-orbicular.* — Alluvial soil, N. E. to O., Tenn., and N. C. July, Aug.

2. C. Medsgèri Shafer. (Wild S.) Similar; root biennial (?); *stipules linear-lanceolate;* petiolar *gland short-cylindric to conic-ovoid;* leaflets 7–10 pairs; *pods thickish*, 5–9 cm. long, *their segments much shorter than broad; seed plump, oblong-obovoid*, twice as long as thick. (*C. marilandica* Man. ed. 6, in part; *C. acuminata* Moench ?) — Dry gravelly soil, Pa. to Ia. and Kan., s. to Ga. and Tex. Aug.

3. C. Tòra L. Annual; *leaflets* 3 *or rarely* 2 *pairs, obovate, obtuse*, with an elongated gland between those of the lower pairs or lowest pair; pods slender, 1.5 dm. long, curved. (*C. obtusifolia* L.) — River-banks, etc., s. Va. to Fla. and Tex.; northw. in Miss. basin to Kan., Mo., and Ind. July–Sept. (Trop. regions.)

4. C. occidentàlis L. Annual; *leaflets* 4–6 *pairs, ovate-lanceolate, acute;* an ovoid gland at the base of the petiole; pods long-linear (12 cm. long), with a tumid border, glabrous. — Waste places and shores, Va. to Fla. and Tex.; northw. in Miss. basin to Mo. and Ind. Aug., Sept. (Nat. from the tropics.)

** *Leaflets small, somewhat sensitive to the touch; stipules striate, persistent; a cup-shaped gland beneath the lowest pair of leaflets; anthers all perfect; flowers in small clusters above the axils; pods flat.*

5. C. Chamaecrísta L. (Partridge Pea.) *Annual*, suberect; *branches usually simple*, ascending; pubescence subappressed, usually scanty; leaflets 10–15 pairs, linear-oblong, oblique at the base; *flowers* (*large*) *on slender pedicels*, 2 or 3 of the showy yellow petals often with a purple spot at base; *anthers* 10, *elongated, unequal* (4 of them yellow, the others purple); style slender. — Sandy fields, Mass. to Minn., and southw., except in the upland regions. July–Sept.

Var. robústa Pollard. Stouter, hirsute with spreading hairs. — Ky. (*Short*), Ill. (*McDonald*), and southw.

6. C. depréssa Pollard. *Slender procumbent perennial* (?); *branches* starting from near the base, *usually again branched; leaflets* (4–10 *pairs*) smaller and less numerous and flowers larger and later than in the otherwise similar *C. Chamaecrista.* — Potosi, Mo. (*Pech*) to Miss. and Fla. July–Sept.

7. C. níctitans L. (Wild Sensitive Plant.) Leaflets 10–20 pairs, oblong-linear; *flowers very small, on very short pedicels; anthers* 5, *nearly equal;* style short. — Sandy fields, N. E. to Fla., w. to Kan. and Ariz. July–Sept.

8. CÉRCIS L. Redbud. Judas Tree

Calyx 5-toothed. Corolla imperfectly papilionaceous; standard smaller than the wings, and inclosed by them in the bud; the keel-petals larger and not united. Stamens 10, distinct, declined. Pod oblong, flat, many-seeded, the upper suture with a winged margin. Embryo straight. — Trees, with rounded heart-shaped simple leaves, caducous stipules, and red-purple flowers in umbel-like clusters along the branches of the last or preceding years, appearing before the leaves, acid to the taste. (The ancient name of the oriental *Judas Tree.*)

1. C. canadénsis L. (Redbud.) Leaves pointed; pods nearly sessile above the calyx. — Rich soil, N. Y. and N. J. to Fla., w. to s. Ont., e. Neb., and Tex. — A small ornamental tree, often cultivated.

9. BAPTÍSIA Vent. False Indigo

Calyx 4–5-toothed. Standard not longer than the wings, its sides reflexed; keel-petals nearly separate, and, like the wings, straight. Stamens 10, distinct. Pods stalked in the persistent calyx, roundish or subcylindric, inflated, pointed, many-seeded. — Perennial herbs, with palmately 3-foliolate (rarely simple) leaves, which generally blacken in drying, and racemed flowers. (Name from βαπτίζειν, *to dye*, from the economical use of some species, which yield a poor indigo.)

* *Racemes many, short and loose, terminal, often leafy at base; flowers yellow.*

1. **B. tinctòria** (L.) R. Br. (Wild Indigo.) Smooth and slender, 3–9 dm. high, rather glaucous; leaves almost sessile; leaflets wedge-obovate, 1.5–2.5 cm. long; stipules and bracts minute and deciduous; pods ovoid-globose, on a stalk longer than the calyx. — Dry woods and plains, s. N. H. to Fla., locally westw. to Ky. and Minn. June–Sept.

* * *Racemes fewer, opposite the leaves.*

+ *Flowers yellow.*

2. **B. villòsa** (Walt.) Ell. Sometimes soft-hairy, usually minutely pubescent when young, erect, 6–9 dm. high, with divergent branches; leaves almost sessile; leaflets wedge-lanceolate or obovate; lower stipules lanceolate and persistent, on the branchlets often small and subulate; racemes many-flowered, pedicels short; bracts subulate, mostly deciduous; pods ovoid-ellipsoid, taper-pointed, minutely pubescent. — Va. to N. C. and Ark. May, June.

+ + *Flowers white or cream-color.*

3. **B. bracteàta** (Muhl.) Ell. *Hairy, low* (3 dm. high), with *divergent branches; leaves almost sessile;* leaflets narrowly oblong-obovate or spatulate; *stipules and bracts large and leafy, persistent; racemes long* (often 3 dm.), *reclined; flowers on elongated pedicels, cream-color;* pods pointed at both ends, hoary. (*B. leucophaea* Nutt.) — Prairies, Mich. to Minn., s. to Tex. May.

4. **B. leucántha** T. & G. *Smooth*, tall, and stout; leaflets oblong-wedge-form, obtuse; *stipules early deciduous; flowers white; pods ovoid-ellipsoid, on a stalk fully twice the length of the calyx.* — Alluvial soil, Ont. and O. to Minn., s. to Fla. and La. June, July.

5. **B. álba** (L.) R. Br. *Smooth*, 3–9 dm. high, *the branches slender and widely spreading; petioles slender; stipules and bracts minute* and deciduous; leaflets oblong or oblanceolate; racemes slender, on a long naked peduncle; *pods linear-oblong*, 2.5–4 cm. long, *short-stalked.* — Dry soil, N. C. to Fla. and Ala.; and reported from Ind., Mo., etc. May.

+ + + *Flowers indigo-blue.*

6. **B. austrâlis** (L.) R. Br. (Blue F.) — Smooth, tall and stout (1.2–1.6 m. high); leaflets oblong-wedge-form, obtuse; stipules lanceolate, as long as the petioles, rather persistent; raceme elongated (3–6 dm.) and many-flowered, erect; bracts deciduous; stalk of the ovoid-ellipsoid pods about the length of the calyx. — Alluvial soil, Pa. to Ga., w. to s. Ind., Kan. and Ark.; cultivated eastw., and established on alluvium of Ct. R. and tributaries, Vt. May, June. — Hybridizes with *B. bracteata*, according to Hitchcock.

10. THERMÓPSIS R. Br.

Pod sessile or shortly stipitate in the calyx, flat, linear, straight or curved. Otherwise nearly as *Baptisia*. — Perennial herbs, with palmately 3-foliolate leaves and foliaceous stipules, not blackening in drying, and yellow flowers in terminal racemes. (Name from θέρμος, *the lupine*, and ὄψις, *appearance*.)

1. **T. móllis** (Michx.) M. A. Curtis. Finely appressed-pubescent, 4–6 dm. high; leaflets rhombic-lanceolate, 2.5–7.5 cm. long; stipules narrow, mostly shorter than the petiole; raceme elongated; pods narrow, short-stipitate, somewhat curved, 5–10 cm. long. — Mts. of s. Va., N. C., and Tenn. May.

11. CLADRÁSTIS Raf. Yellow Wood. Virgilia

Calyx 5-toothed. Standard large, roundish, reflexed; the distinct keel-petals and wings straight, oblong. Stamens 10, distinct; filaments slender, incurved above. Pod short-stalked above the calyx, linear, flat, thin, marginless, 4–6-seeded, at length 2-valved. — A handsome tree, with yellow wood (yielding a dye), smooth bark, nearly smooth pinnate leaves of 7–11 oval or ovate leaflets, and ample panicled racemes (2.5–5 dm. long) of showy white flowers drooping

from the ends of the branches. Stipules obsolete. Base of the petioles hollow, inclosing the leaf-buds of the next year. Bracts minute and fugacious. (Name from κλάδος, *a branch*, and θραυστός, *brittle*.)

1. **C. lùtea** (Michx. f.) Koch. Sometimes 15 m. high; pods 7.5–10 cm. long. (*C. tinctoria* Raf.) — Rich woods and calcareous bluffs, Ky. to N. C., n. Ala., and Mo.; also in cultivation. May.

12. SOPHÒRA L.

Calyx bell-shaped, shortly 5-toothed. Standard rounded; keel nearly straight. Stamens distinct or nearly so. Pod coriaceous, stipitate, terete, more or less constricted between the seeds, indehiscent. Seeds subglobose. — Shrubby or ours an herbaceous perennial, the leaves pinnate with numerous leaflets, and flowers white or yellow in terminal racemes. (Said by Linnaeus to be the ancient name of an allied plant.)

1. **S. serícea** Nutt. Silky-canescent, erect, 3 dm. high or less; leaflets oblong-obovate, 6–12 mm. long; flowers white; pods few-seeded. — Prairies, Neb. and Kan. to Col., Tex., and Ariz. Apr., May. (Mex.)

13. CROTALÀRIA [Dill.] L. Rattle-box

Calyx 5-cleft, scarcely 2-lipped. Standard large, heart-shaped; keel scythe-shaped. Sheath of the monadelphous stamens cleft on the upper side; 5 of the anthers smaller and roundish. Pod inflated, subcylindric, many-seeded. — Herbs with simple leaves. Flowers yellow. (Name from κρόταλον, *a rattle*; the loose seeds rattling in the coriaceous inflated pods.)

* *Pubescence spreading-ascending, prominent.*

1. **C. sagittàlis** L. *Annual*, hairy, *suberect*, 7.5–25 cm. high; *leaves oval or oblong-lanceolate*, scarcely petioled, *narrowed to each end; stipules often conspicuous*, united and decurrent on the stem, so as to be inversely arrow-shaped; peduncles few-flowered; corolla not longer than the calyx; pod blackish. — Sandy soil, e. Mass. and s. Vt. to Fla. and Tex., chiefly coastal; and northw. in Miss. basin to Ind. and S. Dak. June–Sept. (Mex.)

2. **C. rotundifòlia** (Walt.) Poir. Thick-rooted *perennial; stems* several, *prostrate or nearly so; leaves suborbicular or oval, rounded at each end; stipules few or wanting.* (*C. ovalis* Pursh.) — Sandy soil, s. Va. to Fla. and La. May–July.

* * *Pubescence appressed and inconspicuous.*

3. **C. Púrshii** DC. Perennial; stems several, erect or ascending; leaves linear to oblong; stipules usually large and conspicuous. — Sandy soil, s. Va. to Fla. and Tex. May–July.

14. GENÍSTA L. Woad-waxen. Whin

Calyx 2-lipped. Standard oblong-oval, spreading; keel oblong, straight, deflexed. Stamens monadelphous, the sheath entire; 5 alternate anthers shorter. Pod mostly flat and several-seeded. — Shrubby plants, with simple leaves, and yellow flowers. (Name from the Celtic *gen*, a bush.)

1. **G. tinctòria** L. (Dyer's Greenweed.) Low, not thorny, with striate-angled erect branches; leaves lanceolate; flowers in spiked racemes. — Established on sterile hills and roadsides, s. Me. to Mass. and e. N. Y. June, July. (Nat. from Eu.)

15. CÝTISUS [Tourn.] L. Broom

Calyx campanulate, with 2 short broad lips. Petals broad, the keel obtuse and slightly incurved. Stamens monadelphous. Pod flat, much longer than the calyx. Seeds several, with a strophiole at the hilum. — Shrubs, with stiff

green branches, leaves mostly digitately 3-foliolate, and large bright yellow flowers. (The ancient Roman name of a plant, probably a *Medicago*.)

1. **C.** SCOPÀRIUS (L.) Link. (SCOTCH B.) Glabrous or nearly so, about 1 m. high; leaflets small, obovate, often reduced to a single one; flowers solitary or in pairs, on slender pedicels, in the axils of the old leaves, forming leafy racemes along the upper branches; style very long and spirally incurved. (*Sarothamnus* Wimmer.) — Sandy barrens, etc., N. S.; s. e. Mass. to Va., and southw. May, June. (Nat. from Eu.)

16. ÙLEX L. FURZE. GORSE

Calyx deeply 2-lipped. Standard ovate; wings and keel oblong, of about equal length. Stamens monadelphous. Pod short-oblong. — Low densely branched shrubs with spine-like phyllodial leaves. (An ancient name, used by Pliny for some not certainly identified plant.)

1. **U.** EUROPAÈUS L. Calyx large, yellow, tomentulose. — Sometimes cultivated as a sand-binder and now somewhat extensively established locally near the coast from Nantucket to Va. (Introd. from Eu.)

17. LUPÌNUS [Tourn.] L. LUPINE

Calyx very deeply 2-lipped. Sides of the standard reflexed; keel scythe-shaped, pointed. Sheath of the monadelphous stamens entire; anthers alternately oblong and roundish. Pod oblong, flattened, often knotty by constrictions between the seeds. Cotyledons thick and fleshy. — Herbs, with palmately 1–15-foliolate leaves, stipules adnate to base of the petiole, and showy flowers in terminal racemes or spikes. (Name from *lupus*, a wolf, because these plants were thought to devour the fertility of the soil.)

1. **L. perénnis** L. (WILD L.) Perennial, somewhat hairy; stem erect, 3–6 dm. high; leaflets 7–11, oblanceolate; flowers in a long raceme, showy, purplish-blue (rarely pale); pods broad, very hairy, 5–6-seeded. — Sandy soil, s. w. Me. to Minn., and s. to the Gulf. May, June. Var. OCCIDENTÀLIS Wats. has stems and petioles more villous. — Mich., n. Ind. (*C. P. Smith*), and Wisc.

18. TRIFÒLIUM [Tourn.] L. CLOVER. TREFOIL

Calyx persistent, 5-cleft, the teeth usually bristle-form. Corolla mostly withering or persistent; the claws of all the petals, or of all except the oblong or ovate standard, more or less united below with the stamen-tube; keel short and obtuse. Tenth stamen more or less separate. Pods small and membranous, often included in the calyx, 1–6-seeded, indehiscent, or opening by one of the sutures. — Tufted or diffuse herbs. Leaves mostly palmately (sometimes pinnately) 3-foliolate; leaflets usually toothed. Stipules united with the petiole. Flowers in heads or spikes. (Name from *tres*, three, and *folium*, a leaf.)

a. Flowers sessile in dense heads.
  Calyx-teeth silky-plumose, surpassing the corolla . . . . . 1. *T. arvense.*
  Calyx-teeth ciliate, villous, or glabrous, surpassed by the corolla.
    Heads cylindrical; corolla scarlet to deep red . . . . . 2. *T. incarnatum.*
    Heads globose or ovoid; corolla magenta or purple (rarely white).
      Calyx soft-hairy . . . . . 3. *T. pratense.*
      Calyx nearly glabrous . . . . . 4. *T. medium.*
a. Flowers pedicellate, in looser heads; pedicels reflexed in age *b.*
  b. Corolla white, roseate, or purple *c.*
    c. Calyx-teeth bristle-tipped.
      Calyx villous or hispid.
        Leaflets narrowly oblong . . . . . 5. *T. virginicum*
        Leaflets obovate . . . . . 6. *T. reflexum.*
      Calyx essentially glabrous.
        Stoloniferous.
          Flowers 1–1.3 cm. long; corolla red; peduncles rarely more than twice the length of the head . . . . . 7. *T. stoloniferum.*

Flowers 6–9 mm. long; corolla white or pink; peduncles mostly 3–many times the length of the heads . . . 8. *T. repens.*
Not stoloniferous . . . . . 9. *T. hybridum.*
c. Calyx-teeth deltoid-lanceolate, herbaceous . . . . . 10. *T. carolinianum.*
b. Corolla yellow.
Corolla conspicuously striate-sulcate in age.
Leaflets all sessile . . . . . 11. *T. agrarium.*
Terminal leaflet stalked . . . . . 12. *T. procumbens.*
Corolla not striate-sulcate . . . . . 13. *T. dubium.*

1. **T. arvénse** L. (Rabbit-foot or Stone C.) Silky branching annual, 1–4 dm. high; *leaflets oblanceolate; heads* becoming very *soft-silky* and *grayish*, ovoid-cylindrical. — Dry sandy or gravelly soil, roadsides, etc. (Nat. from Eu.)

2. **T. incarnàtum** L. (Crimson or Italian C.) Suberect *soft-pubescent* annual, 3–5 dm. high; heads cylindrical, often 5 cm. long; *leaflets obovate.* — Often cultivated, and sparingly escaping. (Introd. from Eu.)

3. **T. praténse** L. (Red C.) Perennial; stems ascending, somewhat hairy; *leaflets oval or obovate, often notched* at the end and marked on the upper side with a pale spot; *stipules broad, bristle-pointed; heads ovoid*, sessile or not rarely pedunculate; corolla magenta to whitish; calyx soft-hairy. — Fields and meadows; extensively cultivated. (Introd. from Eu.)

4. **T. mèdium** L. (Zigzag C.) Stems zigzag, smoothish; *leaflets oblong, entire*, and spotless; *heads mostly stalked;* flowers deeper purple; calyx-tube nearly or quite glabrous; teeth slightly rigid, scarcely ciliate. — Dry hills, e. Mass.; several reports from other Am. localities appear to refer to the preceding species. (Nat. from Eu.)

5. **T. virgínicum** Small. Low villous perennial, not stoloniferous; *leaflets narrowly oblong, denticulate;* flowers nearly white, in large heads; *short calyx canescent-pubescent.* — Rocky slopes, Kate's Mt., W. Va.

6. **T. refléxum** L. (Buffalo C.) Annual or biennial; *stems ascending, downy; leaflets obovate-oblong*, finely toothed; stipules thin, ovate; standard rose-red; wings and keel whitish; calyx-teeth hairy; pods 3–5-seeded. — Borders of fields and woods, w. N. Y. and Ont. to Ia., "Neb.," Kan., and southw.

7. **T. stoloníferum** Muhl. Smooth *perennial; stems with long runners* from the base; *leaflets broadly obovate or obcordate*, minutely toothed; heads loose; flowers white, tinged with purple; pods 2-seeded. — Open woodlands and prairies, O. and Ky., w. to Ia., "Neb.," and Kan.

8. **T. rèpens** L. (White C.) Smooth perennial; the slender *stems spreading and creeping; leaflets inversely heart-shaped* or merely notched, obscurely toothed; stipules scale-like, narrow; petioles and especially the peduncles very long; heads small and loose; *calyx much shorter than the white corolla;* pods about 4-seeded. — Fields and copses, everywhere; indigenous only in the northern part of our range, if at all. (Eurasia.)

9. **T. hýbridum** L. (Alsike C.) Resembling *T. repens*, but the stems erect or ascending, not rooting at the nodes; *leaflets* ovate, *rounded at apex;* flowers rose-tinted. — Generally common. (Introd. from Eu.)

10. **T. carolinià̀num** Michx. Somewhat pubescent small perennial, *procumbent, in tufts;* leaflets wedge-obovate and slightly notched; stipules ovate, foliaceous; heads small, on slender peduncles; *calyx-teeth* lanceolate, nearly *equaling the purplish corolla; standard pointed;* pods 4-seeded. — Rocky places, Va. to Fla., Tex., and Kan.; introd. on waste ground near Philadelphia.

11. **T. agràrium** L. (Yellow or Hop C.) Smoothish annual, somewhat upright, 1–3 dm. high; *leaflets obovate-oblong, all three from the same point* (palmate) and nearly sessile; *stipules narrow, cohering with the petiole for more than half its length;* corolla yellow, persistent, becoming dry and brown in age. (*T. aureum* at least of Am. auth.) — Sandy fields and roadsides; N. S. to Va.; also in w. N. Y., Ont., and Ia. (Nat. from Eu.)

12. **T. procúmbens** L. (Low Hop C.) Similar; stems spreading or ascending, pubescent, 1–1.5 dm. high; *leaflets wedge-obovate*, notched at the end, *the lateral at a small distance from the other* (pinnately 3-foliolate); *stipules ovate, short.* — Sandy fields and roadsides, common. (Nat. from Eu.)

13. T. DÙBIUM Sibth. Similar to the preceding but smaller throughout; heads loosely few-flowered; *standard* 4 mm. long, about 11-nerved, scarcely or *not* at all *striate* in age. (*T. procumbens*, var. *minus* Man. ed. 6.) — Similar situations, Mass. to Va. and Tenn.; also locally established westw. (Nat. from Eu.)

19. MELILÒTUS [Tourn.] Hill. MELILOT. SWEET CLOVER

Flowers much as in *Trifolium*, but in spike-like racemes, small. Corolla deciduous, free from the stamen-tube. Pod ovoid, coriaceous, wrinkled, longer than the calyx, scarcely dehiscent, 1–2-seeded. — Annual or biennial herbs, fragrant in drying, with pinnately 3-foliolate leaves. (Name from μέλι, *honey*, and λωτός, some leguminous plant.)

1. M. OFFICINÀLIS (L.) Lam. (YELLOW M.) Upright, usually tall; *leaflets* obovate-oblong, obtuse, *closely serrate; petals* yellow, of nearly equal length, 6–9 *mm. long; pod* 2.5–3.5 *mm. long*, glabrous or glabrate, prominently *cross-ribbed.* — Waste or cultivated ground, common. (Nat. from Eu.)

2. M. ALTÍSSIMA Thuill. Similar; *leaflets* linear- to lance-oblong, *subentire or remotely toothed; pod* gibbous, 4.5–6 *mm. long, pubescent, obscurely reticulate.* — Ballast about Atlantic ports. (Adv. from Eu.)

3. M. ÍNDICA (L.) All. Low; *leaflets* cuneate-oblanceolate or -obovate, *truncate or emarginate*, toothed above the middle; *corolla yellow*, 2–2.5 *mm. long; pod* gibbous, about 2 *mm. long, alveolate.* — Ballast and waste places about Atlantic ports. (Adv. from Eurasia.)

4. M. ÁLBA Desr. (WHITE M.) Tall; leaflets narrowly obovate to oblong, serrate, truncate or emarginate; *corolla white*, 4–5 mm. long, *the standard longer than the other petals;* pod 3–4 mm. long, somewhat reticulate. — Rich soil, roadsides, etc., common. (Nat. from Eu.)

20. MEDICÀGO [Tourn.] L. MEDICK

Flowers nearly as in *Melilotus*. Pod 1–several-seeded, scythe-shaped, incurved, or variously coiled. — Leaves pinnately 3-foliolate; leaflets toothed; stipules often cut. (Μηδική, the name of the *Alfalfa*, because it came to the Greeks from Media.)

* *Perennials; pods straightish or loosely coiled, unarmed.*

1. M. SATÌVA L. (LUCERNE, ALFALFA.) Upright, smooth, perennial; leaflets obovate-oblong, toothed; *flowers bluish-purple, racemed; pods twisted.* — Cultivated for green fodder and often spontaneous. (Introd. from Eu.)

2. M. FALCÀTA L. Similar; leaflets linear; *flowers yellow; pod straightish* or scarcely coiled. — Waste ground, eastw., rare and casual; perhaps not persisting. (Adv. from Eu.)

* * *Annuals; pods (often armed) reniform or tightly coiled.*

3. M. LUPULÌNA L. (BLACK M., NONESUCH.) Procumbent, pubescent, annual; leaflets wedge-obovate, toothed at the apex; *flowers yellow, in short spikes; pods kidney-form*, 1-seeded. — Waste places, common. (Adv. from Eu.)

4. M. ARÁBICA Huds. (SPOTTED M.) Spreading or procumbent annual, somewhat pubescent; leaflets obcordate, with a purple spot, minutely toothed; *peduncles 3–5-flowered;* flowers yellow; *pods compactly spiral*, of 2 or 3 turns, compressed, *furrowed on the thick edge*, and fringed with a double row of curved prickles. (*M. maculata* Sibth.) — Middle Atlantic States to N. B., on waste ground, not common. (Adv. from Eu.)

5. M. HÍSPIDA Gaertn. (BUR CLOVER.) Nearly glabrous; *pods deeply reticulated*, and with a *thin keeled edge;* otherwise as the last. (*M. denticulata* Willd.) — Waste places, frequent; a fodder plant westw. (Introd. from Eu.)

21. ANTHÝLLIS [Rivinius] L.

Calyx 5-toothed, loose, persistent and somewhat vesicular in age. Corolla yellow to crimson. Keel blunt or short-pointed. Pod mostly stalked, included in the calyx, nearly or quite indehiscent, 2–several-seeded. — Herbs, with pinnate leaves and large loose clover-like heads. (An ancient plant-name employed by Dioscorides.)

1. **A.** VULNERÀRIA L. Pubescent, 2–3 dm. high; leaflets mostly 5–13 (on the basal leaves often fewer and sometimes reduced to a solitary enlarged terminal leaflet); heads ovoid or subglobose, involucrate. — In clover fields, Oxford Co., Ont. (*Burgess*); also occasional as a ballast plant about Atlantic ports. (Adv. from Eu.)

22. HOSÁCKIA Dougl.

Calyx-teeth nearly equal. Petals free from the diadelphous stamens; standard ovate or roundish, its claw often remote from the others; wings obovate or oblong; keel incurved. Pod linear, compressed or somewhat terete, sessile, several-seeded. — Herbs, with pinnate leaves (in ours 1–3-foliolate, with gland-like stipules), and small yellow or reddish flowers in umbels (ours solitary) upon axillary leafy-bracteate peduncles. (Named for *Dr. David Hosack*, 1769–1835, professor of botany and materia medica in Columbia College.)

1. **H. americàna** (Nutt.) Piper. Annual, more or less silky-villous or subglabrous, often 3 dm. high or more; leaves nearly sessile, the 1–3 leaflets ovate to lanceolate (0.6–1.8 cm. long); peduncles often short, bracteate with a single leaflet. (*Lotus* Bischoff; *H. Purshiana* Benth.) — Dry soil, w. Minn. to Ark., and westw.; also introduced in Greene Co., Ill. (according to McDonald).

23. LÒTUS [Tourn.] L. BIRD'S-FOOT TREFOIL

Similar to the preceding genus but with pinnately 5-foliolate leaves, the basal pair of leaflets simulating stipules. (Ancient Greek plant-name.)

L. CORNICULÀTUS L. Diffuse many-stemmed perennial; flowers yellow in slender-peduncled capitate umbels. — Dry meadows, Washington, D. C. (*Pech*), and on ballast, etc., to N. S. (Adv. from Old World.)

24. PSORÀLEA L.

Calyx 5-cleft, persistent, the lower lobe longest. Stamens diadelphous or sometimes monadelphous. Pod seldom longer than the calyx, thick, often wrinkled, indehiscent, 1-seeded. — Perennial herbs, usually sprinkled all over or roughened (especially the calyx, pods, etc.) with glandular dots or points. Leaves mostly 3–5-foliolate. Flowers spiked or racemed, white or mostly blue-purplish. Root sometimes tuberous and farinaceous. (Name, ψωραλέος, *scurfy*, from the glands or dots.)

* *Leaves pinnately 3-foliolate.*

1. **P. Onóbrychis** Nutt. Nearly smooth and free from glands, *erect*, 1–2 m. high; *leaflets lanceolate-ovate, taper-pointed*, 7–8 mm. long; *stipules and bracts awl-shaped;* racemes elongated; peduncles shorter than the leaves; pods roughened and wrinkled. — River-banks and deciduous woods, O. to Ill. and Mo.; also s. and e. to S. C.

2. **P. stipulàta** T. & G. Nearly smooth and glandless; *stems diffuse; leaflets ovate-elliptical*, reticulated; *stipules ovate; flowers in heads* on rather short peduncles; *bracts broadly ovate, sharp-pointed.* — Limestone ledges, Ohio R. above Louisville, Ky., and New Albany, Ind.; very local. June.

3. **P. pedunculàta** (Mill.) Vail. Somewhat pubescent, more or less glandular; *stems erect*, 3–6 dm. high, slender; *leaflets lanceolate or narrowly oblong; spike cylindrical*, long-peduncled; *stipules awl-shaped;* bracts ovate or lanceolate, taper-pointed; pods strongly wrinkled transversely. (*P. melilotoides*

Michx.) — Dry soil, Fla. to Tenn., Sandusky, O. (*Moseley*), s. Ind., and Kan. June.

* * *Leaves palmately 3–5-foliolate; roots not tuberous.*

+ *Fruit more or less compressed, ovate.*

4. **P. tenuiflòra** Pursh. Slender, erect, much branched and bushy, 6–12 dm. high, *minutely hoary-pubescent* when young; leaflets varying from linear to obovate-oblong, 1.2–3.6 cm. long, glandular-dotted; *flowers* (4–6 mm. long) *in loose racemes;* lobes of the calyx and bracts ovate, acute; pod glandular. — Prairies, Ill. to Minn., Tex., and westw. June–Sept.

Var. **floribúnda** (Nutt.) Rydb. Flowers more numerous, slightly larger and in denser racemes. (*P. floribunda* Nutt.) — Same range.

5. **P. argophýlla** Pursh. *Silvery silky-white* all over, erect, divergently branched, 3–9 dm. high; *leaflets elliptical-lanceolate; spikes interrupted;* flowers 8–10 mm. long; lobes of the calyx and *bracts lanceolate.* — High plains, n. Wisc. to Ia., Mo., and westw. June.

6. **P. digitàta** Nutt. More slender and less hoary, 3–6 dm. high; leaflets linear-oblanceolate; *bracts* of the interrupted spike *obcordate*; calyx-lobes oblong, acute. — Sandy soil, Kan. to Col. and Tex. June, July.

+ + *Fruit globose.*

7. **P. lanceolàta** Pursh. Glabrous or nearly so, yellowish-green, densely punctate; leaflets 3, linear to oblanceolate; flowers small, in very short spikes; calyx 2 mm. long, with short broad teeth. (*P. micrantha* Gray.) — Ia. and Kan. to the Sask., and westw.

* * * *Leaves palmately 5-foliolate; root tuberous; spike-like racemes dense.*

8. **P. esculénta** Pursh. Roughish hairy all over; stem stout, 1–4 dm. high, erect, from a tuberous or turnip-shaped farinaceous root; leaflets obovate- or lanceolate-oblong; spikes ellipsoid, long-peduncled; lobes of the calyx and bracts lanceolate, nearly equaling the corolla (1.2 cm. long). — High plains, Wisc. to Tex., and northwestw. May–July. — The Pomme blanche, or Pomme de Prairie, of the voyageurs.

25. AMÓRPHA L.

Calyx inversely conical, 5-toothed, persistent. Standard (the other petals entirely wanting!) wrapped around the stamens and style. Stamens 10, monadelphous at the very base, otherwise distinct. Pod oblong, longer than the calyx, 1–2-seeded, roughened, tardily dehiscent. — Shrubs, with odd-pinnate leaves; the leaflets marked with minute dots, usually stipellate, the midvein excurrent. Flowers violet or purple, crowded in clustered terminal spikes. (Name, ἄμορφος, *deformed*, from the absence of four of the petals.)

* *Leaflets small* (1.2 *cm. long or less*), *crowded.*

1. **A. canéscens** Pursh. (Lead Plant.) *Whitened with hoary down*, 3–14 dm. high; leaflets 31–51, oblong-elliptical, becoming smoothish above; spikes usually clustered at the summit. — Hills and prairies, Ind. to Man., and southw. June–Aug.

2. **A. microphýlla** Pursh. *Nearly glabrous* throughout, 3 dm. high or less; leaflets rather rigid; spikes usually solitary. — Prairies, Minn. and Man. to Kan. June, July.

* * *Leaflets larger, scattered.*

3. **A. fruticòsa** L. (False Indigo.) A tall shrub, rather pubescent or smoothish; leaflets 9–25, oblong to broadly elliptical. — River-banks, s. Pa. to Fla., w. to Sask., Tex., and the Rocky Mts.; often cultivated, and escaping eastw. May, June. (Mex.) — Very variable.

Var. **angustifòlia** Pursh. Leaflets narrower, lance-oblong or lance-elliptic, of firmer texture; fruit somewhat smaller, 6–8 mm. long. (*A. angustifolia* Boynton.) — Banks of streams, Ia., westw. and southwestw.

26. DÀLEA Juss.

Calyx 5-cleft or -toothed. Corolla imperfectly papilionaceous; petals all on claws; the standard heart-shaped, inserted in the bottom of the calyx; the keel and wings borne on the middle of the monadelphous sheath of filaments, which is cleft down one side. Stamens 10, rarely 9. Pod membranaceous, 1-seeded, indehiscent, inclosed in the persistent calyx. — Mostly herbs, more or less glandular-dotted, with minute stipules; the small flowers in terminal spikes or heads. (Named for *Samuel Dale*, 1659–1739, an English botanist.) PAROSELA Cav.

1. **D. alopecuroìdes** Willd. Erect *annual*, 3–6 dm. high; leaflets 19–35, glabrous, linear-oblong; flowers light rose-color or whitish, in cylindrical spikes; bracts ovate-lanceolate, acuminate, deciduous; calyx very villous, with long slender teeth. (*Parosela Dalea* Britton.) — Alluvial soil, Ill. to Minn. and Ala., w. to the Rocky Mts. Aug., Sept. (Mex.)

2. **D. enneándra** Nutt. Erect *perennial*, 3–12 dm. high, branching; leaflets 5–13, linear, 4–6 mm. long; spikes loosely flowered; bracts conspicuous, persistent, almost orbicular and very obtuse; petals white; calyx densely villous, the long teeth beautifully plumose. (*D. laxiflora* Pursh.) — Dry soil, Ia. and Mo. to Tex. and Col. May–Aug.

27. PETALOSTÈMUM Michx. PRAIRIE CLOVER

Calyx 5-toothed. Corolla indistinctly papilionaceous; petals all on thread-shaped claws, 4 of them nearly alike and spreading, borne on the top of the monadelphous and cleft sheath of filaments, alternate with the 5 anthers; the fifth (standard) inserted in the bottom of the calyx, heart-shaped or oblong. Pod membranaceous, inclosed in the calyx, indehiscent, 1–2-seeded. — Chiefly perennial herbs, upright, glandular-dotted, with crowded odd-pinnate leaves, minute stipules, and small flowers in very dense terminal and peduncled heads or spikes. (Name, often but not originally spelled *Petalostemon*, combined of the two Greek words for petal and stamen, alluding to the peculiar union of these organs in this genus.) KUHNISTERA Lam.

* *Corolla rose-colored.*

1. **P. purpûreum** (Vent.) Rydb. *Smoothish; leaflets* 5, *narrowly linear; heads globose-ovoid* or short-cylindrical when old; bracts pointed, not longer than the silky-hoary calyx. (*P. violaceum* Michx.; *Kuhnistera* MacM.) — Dry prairies, Ind. to Man. and La., w. to the Rocky Mts. June–Aug.

2. **P. villòsum** Nutt. *Soft-downy or silky* all over; *leaflets* 13–17, *linear or oblong*, small (8–10 mm. long); *spikes cylindrical*, 2.5–12 cm. long, short-peduncled, soft-villous. (*Kuhniastera* Ktze.) — Sandy soil, Wisc. to Sask. and Tex., w. to Rocky Mts. July.

3. **P. foliòsum** Gray. *Smooth*, very leafy; *leaflets* 15–29, *linear-oblong; spikes cylindrical*, short-peduncled; bracts slender-awned from a lanceolate base, exceeding the glabrous calyx. (*Kuhniastera* Ktze.) — River-banks and rocky hills, Ill. and Tenn. July–Sept.

** *Corolla white.*

4. **P. multiflòrum** Nutt. *Glabrous* throughout, erect, branching; leaflets 3–9, linear to oblong; *heads globose*, the subulate-setaceous bracts much shorter than the acutely toothed calyx. (*Kuhnistera* Heller.) — Prairies, w. Ia. (*Pammel*) to Ark. and Tex. Aug.

5. **P. cándidum** Michx. *Smooth; leaflets* 7–9, *lanceolate or linear-oblong, heads short-cylindrical;* bracts awned, longer than the nearly glabrous calyx. (*Kuhniastera* Ktze.) — Dry prairies, Ind. to Man., La., and w. to the Rocky Mts. June, July.

28. TEPHRÒSIA Pers. Hoary Pea

Calyx about equally 5-cleft. Standard roundish, usually silky outside, turned back, scarcely longer than the coherent wings and keel. Stamens monadelphous or diadelphous. Pod linear, flat, several-seeded, 2-valved. — Hoary perennial herbs, with odd-pinnate leaves, and white or purplish racemed flowers. Leaflets mucronate, veiny. (Name from τεφρός, *ash-colored* or *hoary*.) Cracca L.

1. **T. virginiàna** (L.) Pers. (Goat's Rue, Catgut.) *Silky-villous* with whitish hairs when young; *stem erect and simple*, 3–6 dm. high, *leafy* to the top; leaflets 17–29, linear-oblong; flowers large and numerous, clustered in a terminal *ellipsoid dense raceme or panicle*, yellowish-white marked with purple. (*Cracca* L.) — Dry sandy soil, s. N. H. to Minn., and southw., chiefly at low altitudes. June, July. — Roots long and slender, very tough. Var. holoserícea (Nutt.) T. & G. has more copious or even woolly pubescence and usually narrower leaflets. — With the typical form, westw.

2. **T. spicàta** (Walt.) T. & G. *Villous with rusty hairs;* stems branched below, straggling or ascending, 6 dm. long, *few-leaved;* leaflets 9–15, obovate or oblong-wedge-shaped, often notched; *flowers few*, in a loose and interrupted *very long-peduncled spike*, reddish. (*Cracca* Ktze.) — Dry soil, Del. and Va. to Fla. and La. May–July.

3. **T. hispídula** (Michx.) Pers. Hairy with some long and rusty or only minute and appressed pubescence; stems slender, 2–6 dm. long, divergently branched, straggling; leaflets 5–17, oblong, varying to obovate-wedge-shaped and oblanceolate; *peduncles longer than the leaves*, 2–4-*flowered;* flowers reddish-purple. (*Cracca* Ktze.) — Dry sandy soil, Va. to Fla. and La. May–July.

29. SESBÀNIA Scop.

Calyx campanulate, equally toothed. Standard large, round. Stamens diadelphous. Ovary many-ovuled; pod long. — Herbs or shrubs with long even-pinnate leaves. Flowers on axillary peduncles or lateral racemes. (Name latinized from the earlier Sesban Adans., said to be of Arabic origin.)

1. **S. macrocárpa** Muhl. Erect annual, 0.7–3 m. high; leaflets 12–25 pairs, narrowly oblong; corolla pale yellow, often spotted; pods 2 dm. in length, narrow, with thickened margins. — Mo. to Fla. and Tex.; introd. in s. Pa.

30. ROBÍNIA L. Locust

Calyx short, 5-toothed, slightly 2-lipped. Standard large and rounded, turned back, scarcely longer than the wings and keel. Stamens diadelphous. Pod linear, flat, several-seeded, at length 2-valved. — Trees or shrubs, often with spines for stipules. Leaves odd-pinnate, the ovate or oblong leaflets stipellate. Flowers showy, in hanging axillary racemes. (Named for *John Robin*, herbalist to Henry IV. of France, and his son *Vespasian Robin*, who first cultivated the Locust-tree in Europe.)

1. **R. Pseùdo-Acàcia** L. (Common L., False Acacia.) *Branches glabrous or glabrate; racemes slender, loose;* flowers white, fragrant; pod smooth. — Along the mts., Pa. to Ga., and in the Ozark Mts. of Mo., Ark., and Okla.; commonly cultivated as an ornamental tree, and for its valuable timber, and naturalized in many places. May, June.

2. **R. viscòsa** Vent. (Clammy L.) *Branchlets and leaf-stalks clammy; flowers crowded in short racemes*, tinged with rose-color, nearly inodorous; pod glandular-hispid. — Va. to Ga., in the mts.; cultivated, like the last, and often escaping. May, June.

3. **R. híspida** L. (Bristly L., Rose Acacia.) Shrub, 1 to 3 m. high; *branchlets and stalks bristly;* flowers large and deep rose-color, inodorous; pods glandular-hispid. — Mts. of Va. to Ga.; cultivated and established northw. May, June.

31. WISTÈRIA Nutt.

Calyx campanulate, somewhat 2-lipped; upper lip of 2 short teeth, the lower of 3 longer ones. Standard roundish, large, turned back, with 2 callosities at its base; keel scythe-shaped; wings doubly auricled at the base. Stamens diadelphous. Pods elongated, thickish, knobby, stipitate, many-seeded, at length 2-valved. Seeds large. — Ovate-lanceolate leaflets 9–13; racemes of large and showy lilac-purple flowers. (Dedicated to *Professor Caspar Wistar*, distinguished anatomist of Philadelphia.) KRAUNHIA Raf. WISTARIA Spreng. (a later spelling).

1. W. frutéscens (L.) Poir. Downy or smoothish when old, *without club-shaped hairs;* racemes short and dense; *calyx-teeth very short.* (*Kraunhia* Raf.; *Bradleya* Britton.) — Alluvial grounds, Va. to Fla. May. — Sometimes cultivated for ornament as is the still handsomer and more showy Chinese species, *W. chinensis* DC.

2. W. macrostàchya Nutt. Racemes 1.5–2 dm. long; *pubescence* of the pedicels and calyx mixed, *including club-shaped hairs; calyx-teeth half to three fourths the length of the tube;* standard less strongly auricled than in the preceding. (*Kraunhia macrostachys* Small; *Bradleya* Small.) — Rich soil, swamps, etc., Ind. (?) to Mo., Kan. (?), and La. May.

32. ASTRÁGALUS [Tourn.] L. MILK VETCH

Calyx 5-toothed. Corolla usually long and narrow; standard narrow, equaling or exceeding the wings and blunt keel, its sides reflexed or spreading. Stamens diadelphous. Pod several–many-seeded, various, mostly turgid, one or both sutures usually projecting into the cell, either slightly or so as to divide the cavity lengthwise into two. — Chiefly herbs (ours perennials), with odd-pinnate leaves and spiked or racemed flowers. Mature pods are usually necessary for certain identification of the species. (The ancient Greek name of a leguminous plant, as also of the ankle-bone.)

§ 1. *Pod turgid, completely or imperfectly 2-celled by the intrusion of the dorsal suture, the ventral suture being not at all or less deeply inflexed.*

* *Pod plum-shaped, succulent, becoming thick and fleshy, indehiscent, not stipitate, completely 2-celled.*

1. A. caryocárpus Ker. (GROUND PLUM.) Pale and minutely appressed-pubescent; leaflets narrowly oblong; flowers in a short spike-like raceme; *corolla violet-purple; fruit glabrous, ovoid-globular, more or less pointed,* about 1.6 cm. in diameter, *very thick-walled,* cellular or corky when dry. (*A. crassicarpus* Nutt.) — Prairies, Sask. and Minn. to Mo., s. w. and w. to Tex. and Col. Apr., May.

2. A. mexicànus A. DC. (GROUND PLUM.) Smoother, or pubescent with looser hairs, larger; leaflets roundish, obovate, or oblong; flowers larger (2–2.5 cm. long); calyx softly hairy; *corolla cream-color, bluish only at the tip; fruit globular, very obtuse* and pointless, 2.5 cm. or more in diameter; otherwise like the last. — Prairies and open plains, Ill. to Kan., s. to La. and Tex. Apr., May. —The unripe fruits of this and the preceding species resemble green plums (whence the popular name) and are eaten raw or cooked.

3. A. platténsis Nutt. Loosely villous; leaflets oblong, often glabrous above; flowers crowded in a short spike or head, cream-color, often tinged or tipped with purple; *fruit ovoid, pointed,* 1.2–1.6 cm. long, with *surface even; calyx villous.* — Gravelly or sandy banks, Minn. to Col. and Tex. Apr.–June.

4. A. tennesseénsis Gray. Hirsute; stipules large; leaves and flowers as in the last; *fruit* 2.4–2.8 cm. long, *pointed, strongly wrinkled.* (*A. plattensis*, var. Gray.) — Ill., Morris (*Vasey*), Ogle Co. (*Bebb*); Tenn. and Ala.; reported also from Mo. Apr., May

** *Pod dry, coriaceous, cartilaginous or membranous, dehiscent.*

+ *Pod completely 2-celled, sessile.*

5. **A. canadénsis** L. *Tall and erect*, 3–16 dm. high, *somewhat pubescent or glabrate;* leaflets 21–27, oblong; *flowers greenish cream-color*, very numerous, in long dense spikes; pods crowded, oblong (1.2 cm. long), glabrous, *terete, scarcely sulcate* and only on the back, nearly straight. (*A. carolinianus* L.) — Dry or gravelly soil, w. Que., shores of L. Champlain, Vt. (*Brainerd*), N. Y. to n. Ga., and far westw. July, Aug.

6. **A. adsúrgens** Pall. Ascending or decumbent, 1–4.5 dm. high, cinereous with minute appressed pubescence or glabrate; leaflets about 21, narrowly oblong; spike dense, with medium-sized pale or purplish flowers; *pubescence of calyx appressed;* pod oblong, 8–10 mm. long, *finely pubescent, triangular-compressed, with a deep dorsal furrow, straight.* — Keewatin to Minn., w. Kan., and westw. (Asia.)

7. **A. hypoglóttis** L. *Slender;* stems 1.5–6 dm. long, diffusely procumbent or ascending, *with a rather loose pubescence* or nearly glabrous; leaflets 15–21, oblong, obtuse or retuse; *flowers violet, capitate; calyx loosely pubescent; pod* as in the last, but *ovate* and *silky-villous.* — Minn. to centr. Kan., and northwestw. May–July. (Eurasia.)

+ + *Pod not completely 2-celled.*

++ *Pod stipitate, pendent.*

8. **A. alpìnus** L. *Diffuse*, from a very loosely forking base, the *prostrate or decumbent branches* 0.5–1.5 dm. long, smooth or slightly hairy; leaflets 11–23; *flowers violet-purple*, or at least the keel tipped with violet or blue; calyx campanulate; *pod* narrowly oblong, short-acuminate, *intensely black-pubescent with long slightly spreading hairs*, triangular-turgid, deeply grooved on the back, straight or curved, its stipe usually rather exceeding the calyx. — Rocky banks and gravelly shores, Arctic Am., s. to Nfd., e. Que., and Col. (Eurasia.)

Var. **Brunetiànus** Fernald. Commonly larger, the branches mostly 2–6 dm. long; leaflets usually 15–29; *mature pods greenish or pale brown, strigose with shorter black or even whitish hairs.* — Limestone ledges and gravelly shores, e. Que. to Hudson B., s. to s. N. B., centr. Me., and Vt.; also in the Rocky Mts. May–Sept.

9. **A. Robbínsii** (Oakes) Gray. Nearly smooth and *erect*, 3 dm. high, slender; leaflets 7–11; calyx more oblong; *flowers white;* pod oblong (1.2 cm. long), obtuse or acutish, *minutely darkish-pubescent*, somewhat laterally compressed, *not dorsally sulcate* or obsoletely so, straight or somewhat incurved, rather abruptly narrowed at base into the often included stipe. — Rocky ledges of the Winooski R., Vt. (station now extinct).

10. **A. Blàkei** Eggleston. Habit and foliage nearly as in the preceding, more robust; *corolla* larger, *bluish-purple; pod triangular in section, sulcate dorsally.* (*A. Robbinsii*, var. *occidentalis* Wats., var. *Jesupi* Eggleston & Sheldon; *A. Jesupi* Britton; *A. occidentalis* Jones.) — Rocky banks, n. Me. to Vt.; also in Rocky Mts.

11. **A. racemòsus** Pursh. Stout, 3–6 dm. high, erect or ascending, appressed-pubescent or glabrate; leaflets 13–25; *flowers* numerous, *white*, pendent; calyx campanulate, gibbous, white-pubescent; *pod* straight, *narrow*, 2.5 cm. long, acute at both ends, *triangular-compressed, deeply grooved on the back, the ventral edge acute.* — Neb. to Mo., westw. and northwestw.

++ ++ *Pod sessile.*

12. **A. parviflòrus** (Pursh) MacM. Subcinereous, slender, 3 dm. or more high; leaflets 11–17, linear-filiform, 1.4–2 cm. long, obtuse or retuse; *racemes loose;* flowers small (6 mm. long); *pod pendent*, 4–6 mm. long, coriaceous, elliptic-ovate, *concave on the back*, the ventral suture prominent, *white-hairy*, at length glabrous, *transversely veined.* (*A. gracilis* Nutt.) — Minn. to Mo., and westw. *A. microlobus* Gray, with leaflets linear-oblong, retuse, 1–1.2 cm. long, said to have been collected in Mo., is scarcely more than a variety of this.

13. A. **distórtus** T. & G. Low, diffuse, many-stemmed, subglabrous; leaflets 17–25, oblong, emarginate; *flowers in a short spike, pale purple;* pod ovate- or lance-oblong, curved, 1.2–1.8 cm. long, glabrous, thick-coriaceous, somewhat grooved on the back, the ventral suture nearly flat. — "W. Va." and Miss. to Ill., Ia., and Tex.

14. A. **lotiflòrus** Hook. Hoary or cinereous with appressed hairs; stems very short; leaflets 7–13, lance-oblong; *flowers yellowish, in few-flowered heads,* with peduncles exceeding the leaves or very short; *calyx campanulate, the subulate teeth exceeding the tube;* pod oblong-ovate, 1.8–2.4 cm. long, acuminate, *acute at base,* canescent, the back more or less impressed, the acute ventral suture nearly straight. — Man. to Mo. (*Bush*), Tex., and B. C.

§ 2. *Pod 1-celled, neither suture being inflexed or the ventral more intruded than the dorsal.*

* *Pod sessile in the calyx; valves strongly convex.*

15. A. **negléctus** (T. & G.) Sheldon. Nearly smooth, erect, 3–6 dm. high; leaflets 11–21, elliptical or oblong, somewhat retuse, minutely hoary beneath; flowers white, rather numerous, in a short spike; calyx dark-pubescent; *pod* coriaceous, *inflated, ovoid-globose,* 1.2–1.8 cm. long, *acute, glabrous, slightly sulcate on both sides,* cavity webby. (*A. Cooperi* Gray.) — Cliffs and clayey banks, e. Que. (according to Macoun); Ont., and w. N. Y. to Minn. and Ia.

16. A. **flexuòsus** Dougl. Ashy-puberulent, ascending, 3 to 6 dm. high; leaflets 11–21, mostly narrow; *flowers* small, *in loose racemes; pod* thin-coriaceous, *cylindric,* 1.6–2.2 cm. long, 4 mm. broad, pointed, straight or curved, puberulent, very shortly stipitate. — Minn. to Col., and northw.

17. A. **eucósmus** Robinson. Decumbent, ashy-puberulent, 3–6 dm. high; leaflets 13–15, oblong, 1.2–2.8 cm. long, glabrous above; long-peduncled racemes at length loose; flowers small, pale blue or purple; *pod* sessile, ovate-oblong, *strongly compressed.* (*A. oroboides,* var. *americanus* Gray; *A. elegans* Britton, not Bunge.) — Gravelly banks, Lab. to n. Me.; Rocky Mts.

* * *Pod slender-stiped; valves flattish.*

18. A. **tenéllus** Pursh. Slender, decumbent, branched from the base, 2–4 dm. high; leaflets 11–15, narrowly oblong to linear, obtuse, pale green; racemes axillary, short-peduncled; flowers small, 7–9 mm. long; petals ochroleucous, sometimes pink-tinged; pod lance-oblong, 1–1.2 cm. long, thin. (*A. multiflorus* Gray; *Homalobus tenellus* Britton.) — Dry sandy plains, w. Minn. to N. Mex. and B. C.

33. OXÝTROPIS DC.

Keel tipped with a sharp projecting point or appendage; otherwise as in *Astragalus.* Pod often more or less 2-celled by the intrusion of the ventral suture. — Our species low nearly acaulescent perennials, with tufts of numerous very short stems from a hard and thick root or rootstock, covered with scaly adnate stipules; pinnate leaves of many leaflets; peduncles scape-like, bearing a head or short spike of flowers. (Name from ὀξύς, *sharp,* and τρόπις, *keel.*) Spiesia Neck. Aragallus Neck.

* *Leaves simply pinnate.*

1. O. **campéstris** DC., var. **johannénsis** Fernald. Villous, 3–5 dm. high; leaflets lanceolate or oblong; *flowers* showy, *rose-colored,* drying purplish-blue; *pods* 2–2.5 *cm. long,* ovate- or oblong-lanceolate, *thin and papery.* (Var. *caerulea* Man. ed. 6, not Koch; *Spiesia campestris* Britton, in part; *Aragallus johannensis* Rydb.) — Gravelly shores, Gaspé Co. to Isle of Orleans, Que., s. to the Restigouche R., N. B., and the Aroostook R., Me.

2. O. **Lambérti** Pursh. *Silky with fine appressed hairs;* leaflets mostly linear; flowers larger, purple, violet, or sometimes white; *pods cartilaginous or firm-coriaceous* in texture, silky-pubescent, strictly erect, cylindraceous-lanceolate and long-pointed, almost 2-celled by intrusion of the ventral suture

(*Spiesia* Ktze. ; *Aragallus* Greene.) — Dry plains, Sask. and Minn. to Mo. and Tex., w. to the mts.

* * *Leaflets numerous, mostly in fascicles of 3–4 along the rhachis.*

3. O. spléndens Dougl. Silky-villous, 1.5–3 dm. high ; scape spicately several-many-flowered ; flowers erect-spreading ; pod ovate, erect, 2-celled, hardly surpassing the very villous calyx. (*Spiesia* Ktze. ; *Aragallus* Greene.) — Plains of Sask. and w. Minn. to N. Mex. and the Rocky Mts.

34. GLYCYRRHÌZA [Tourn.] L. Liquorice

Calyx with the two upper lobes shorter or partly united. Anther-cells confluent at the apex, the alternate ones smaller. Pod ovate or oblong-linear, compressed, scarcely dehiscent, few-seeded. The flower, etc., otherwise as in *Astragalus*. — Long perennial root sweet (whence the name, from γλυκύς, *sweet*, and ῥίζα, *root*) ; herbage glandular-viscid ; leaves odd-pinnate, with minute stipules ; flowers in axillary spikes, white or bluish.

1. G. lepidòta (Nutt.) Pursh. (Wild L.) Tall (6–9 dm. high) ; leaflets 15–19, oblong-lanceolate, mucronate-pointed, sprinkled with little scales when young, and with corresponding dots when old ; spikes peduncled, short ; flowers whitish ; pods oblong, beset with hooked prickles. — Hudson B. and Minn. to Mo., N. Mex., and westw. ; also sporadically on waste land, etc., eastw.

35. AESCHYNÓMENE L. Sensitive Joint Vetch

Calyx 2-lipped ; the upper lip 2-, the lower 3-cleft. Standard roundish ; keel boat-shaped. Stamens diadelphous in two sets of 5 each. Pod flattened, composed of several easily separable joints. — Leaves odd-pinnate, with several pairs of leaflets, sometimes sensitive, as if shrinking from the touch (whence the name, from αἰσχυνομένη, *being ashamed*).

1. A. virgínica (L.) B S P. Erect bristly annual ; leaflets 37–51, linear ; racemes few-flowered ; flowers yellow, reddish externally ; pod stalked, 6–10-jointed. (*A. hispida* Willd.) — Along rivers, N. J. and s. Pa. to Fla. and La.

36. CORONÍLLA L.

Calyx 5-toothed. Standard orbicular ; keel incurved. Stamens diadelphous, 9 and 1. Pod terete or 4-angled, jointed ; the joints subcylindric. — Glabrous herbs or shrubs, with pinnate leaves, and the flowers in umbels terminating axillary peduncles. (Diminutive of *corona*, a crown, alluding to the inflorescence.)

1. C. varia L. A perennial herb with ascending stems ; leaves sessile ; leaflets 15–25, oblong ; flowers rose-color ; pods coriaceous, 3–7-jointed, the 4-angled joints 6–8 mm. long. — Roadsides and waste places, N. E. to N. J. (Nat. from Eu.)

37. HEDÝSARUM [Tourn.] L.

Calyx 5-cleft, the lobes awl-shaped and nearly equal. Keel nearly straight, obliquely truncate, not appendaged, longer than the wings. Stamens diadelphous, 9 and 1. Pod flattened, composed of several equal-sided separable roundish joints connected in the middle. — Perennial herbs ; leaves odd-pinnate. (Name composed of ἡδύς, *sweet*, and ἄρωμα, *smell*.)

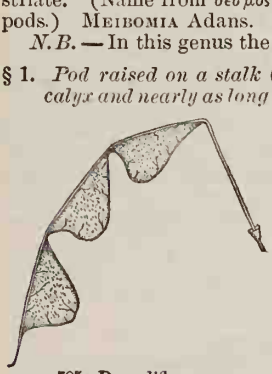
1. H. boreàle Nutt. Leaflets 13–21, oblong or lanceolate, nearly glabrous ; stipules scaly, united opposite the petiole ; raceme of many deflexed magenta to white flowers ; standard shorter than the keel ; joints of the pod 3–4, smooth, reticulated. (*H. americanum* Britton.) — Rocky or gravelly banks, Nfd. and Lab. to Alaska, s. to St. John Valley, N. B. and Me., mts. of n. Vt., n. shore of L. Superior, S. Dak., and Rocky Mts. to Col June–Aug

38. DESMÒDIUM Desv. Tick Trefoil

Calyx usually 2-lipped. Standard obovate; wings adherent to the straight or straightish and usually truncate keel, by means of a little transverse appendage on each side of the latter. Stamens diadelphous, 9 and 1, or monadelphous below. Pod flat, deeply lobed on the lower margin, separating into flat reticulated joints (mostly roughened with minute hooked hairs). — Perennial herbs, with pinnately 3-foliolate (rarely 1-foliolate) leaves, stipellate. Flowers in axillary or terminal racemes, often panicled, and 2 or 3 from each bract, purple or purplish, often turning green in withering. Stipules and bracts scale-like, often striate. (Name from δεσμός, *a bond* or *chain*, from the connected joints of the pods.) Meibomia Adans.

N.B. — In this genus the figures of the loments are on a scale of 1½.

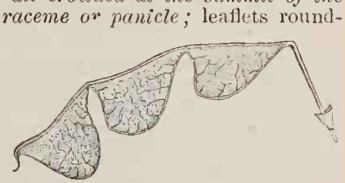
§ 1. *Pod raised on a stalk (stipe) many times longer than the slightly toothed calyx and nearly as long as the pedicel, straightish on the upper margin, deeply sinuate on the lower; the 1–4 joints mostly half-obovate and concave on the back; stamens monadelphous below; plants nearly glabrous; stems erect or ascending; raceme terminal, panicled; stipules bristle-form, deciduous.*



785. D. nudiflorum.

1. D. nudiflòrum (L.) DC. *Leaves all crowded at the summit of sterile stems;* leaflets broadly ovate, bluntish, whitish beneath; *raceme elongated on an ascending mostly leafless stalk or scape* 6–10 dm. high. (*Meibomia* Ktze.) — Dry woods, s. Me. to w. Que., Ont., Minn. and southw. Fig. 785.

2. D. grandiflòrum (Walt.) DC. *Leaves all crowded at the summit of the stem from which arises the elongated naked raceme or panicle;* leaflets round-ovate, taper-pointed, green both sides, the end one round (1–1.3 dm. long). (*D. acuminatum* DC.; *Meibomia grandiflora* Ktze.) — Rich woods, centr. Me. to Ont., S. Dak., and southw. Fig. 786.



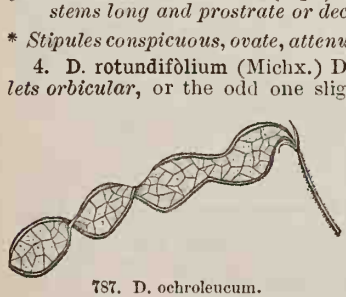
786. D. grandiflorum.

3. D. pauciflòrum (Nutt.) DC. *Leaves scattered* along the low (2–4 dm. high) ascending stems; leaflets rhombic-ovate, bluntish, pale beneath; *raceme few-flowered,* terminal. (*Meibomia* Ktze.) — Woods, Ont. to Pa., Mich., Kan., and southw.

§ 2 *Pod raised on a stalk (stipe) little if at all surpassing the deeply cleft calyx; stems long and prostrate or decumbent; racemes axillary and terminal.*

* *Stipules conspicuous, ovate, attenuate, striate, persistent; racemes mostly simple.*

4. D. rotundifòlium (Michx.) DC. *Soft-hairy all over,* truly prostrate; *leaflets orbicular,* or the odd one slightly rhomboid; *flowers purple;* pods almost equally sinuate on both edges, 3–5-jointed; the joints rhomboid-oval. (*Meibomia Michauxii* Vail.) — Dry woods, e. Mass. to Fla., w. to Minn., Mo., and La. — A form with ovate leaflets occurs in Va. (*Curtiss*).



787. D. ochroleucum.

5. D. ochroleùcum M. A. Curtis. *Stems sparsely hairy,* decumbent; leaflets nearly glabrous, ovate, acute or obtuse, transversely reticulated beneath, the lateral ones smaller or sometimes wanting; racemes much elongated; *corolla whitish; pods twisted,* 2–4-jointed, the large rhomboid joints smooth and reticulated but the margins downy. (*Meibomia* Ktze.) — Woodlands, N. J. and Del. to Ga. and Mo. Fig. 787.

** *Stipules smaller, lanceolate and awl-shaped, less persistent; racemes panicled.*

788. D. glabellum.

6. D. glabéllum (Michx.) DC. *Glabrous or nearly so*, procumbent; *leaflets ovate or ovate-oblong*, rather obtuse, much smaller than in the two preceding (3–6 cm. long); corolla purple; pods 2–4-jointed, flat, the oval-rhomboid joints minutely scabrous throughout. (*D. humifusum* Beck; *Meibomia glabella* Ktze.) — Dry sandy soil, Mass. to s. Pa., Md., and southw. Fig. 788.

§ 3. *Pod slightly if at all stalked in the calyx; racemes panicled.*

* *Stems tall* (1–2 *m. high*) *and erect; the persistent stipules and deciduous bracts large and conspicuous, ovate or ovate-lanceolate, taper-pointed; flowers rather large.*

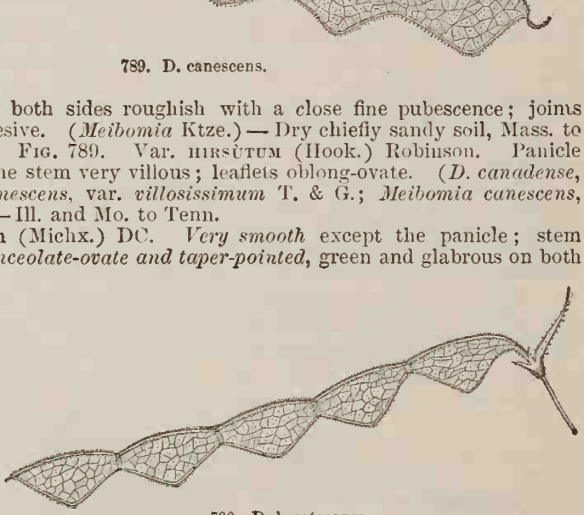
← *Pods of* 4–7 *unequal-sided rhombic joints, which are considerably longer than broad* (*about* 1.2 *cm. long*).

7. D. canéscens (L.) DC. *Stem* loosely branched, *hairy*, branches clothed with both minute and hooked as well as longer spreading rather glutinous hairs; *leaflets ovate, bluntish, about the length of the petioles, whitish and*

789. D. canescens.

reticulated beneath, both sides roughish with a close fine pubescence; joints of the pod very adhesive. (*Meibomia* Ktze.) — Dry chiefly sandy soil, Mass. to Minn. and southw. Fig. 789. Var. hirsùtum (Hook.) Robinson. Panicle and upper part of the stem very villous; leaflets oblong-ovate. (*D. canadense*, var. Hook.; *D. canescens*, var. *villosissimum* T. & G.; *Meibomia canescens*, var. *hirsuta* Vail.) — Ill. and Mo. to Tenn.

8. D. bracteòsum (Michx.) DC. *Very smooth* except the panicle; stem straight; *leaflets lanceolate-ovate and taper-pointed*, green and glabrous on both sides, longer than the petiole; the conspicuous bracts and stipules 1–1.5 cm. long; joints of the pod rhomboid-oblong, smoothish. (*D. cuspidatum* Hook.; *Meibomia bracteosa* Ktze.)— Thickets, s. N. H. to Minn., and southw. Fig. 790.



790. D. bracteosum.

Var. longifòlium (T. & G.) Robinson. Stem with some persisting pubescence; leaflets scabrous above, villous beneath. (*D. canadense*, var. T. & G.; *Meibomia longifolia* Vail.) — Mich. to Kan. and Ark.

← ← *Pods of* 3–5 *oval joints* (*not over* 6 *mm. long*).

9. D. illinoénse Gray. Erect, 1–2 m. high; stem and leaves with short rough pubescence; leaflets ovate-oblong or -lanceolate, 5–10 cm. long, obtuse,

791. D. illinoense.

subcoriaceous, cinereous beneath, veins and veinlets prominent, strongly reticulated, the lower leaflets nearly equaling the petiole; pods scarcely over 2.5 cm. long, sinuate on both margins (more deeply below). (*Meibomia* Ktze.) — Dry ground, Lakeside, O. (*Moseley*); Jackson Co., Mich. (*Wheeler*); Ill. to Neb., Kan., and Okla. Fig. 791.

** *Stem 6–15 dm. high, erect; stipules and bracts mostly deciduous, small and inconspicuous; joints of the pod 3–5, triangular or half-rhombic or very unequal-sided and rhomboidal, longer than broad, 6 mm. or less in length, flowers middle-sized.*

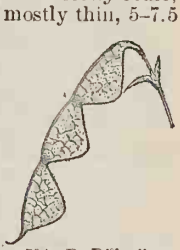
10. **D. laevigàtum** (Nutt.) DC. *Smooth* or nearly so throughout; stem straight; *leaflets ovate*, bluntish, pale beneath, 5–7.5 cm. long, thin and without prominulous reticulation; panicles minutely rough-pubescent. (*Meibomia* Ktze.)—Pine woods, s. N. Y. and N. J. to Fla., Mo., and Tex. Fig. 792. From Va. southw. passing to D. RHOMBIFÒLIUM (Ell.) DC., a more pubescent plant, with thickish leaves, the veins prominulous beneath. (*Meibomia* Vail.)

792. D. laevigatum.

793. D. viridiflorum.

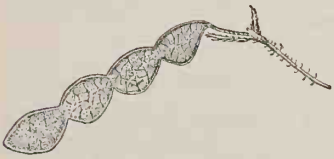
11. **D. viridiflòrum** (L.) Beck. *Stem very downy*, rough at the summit; *leaflets broadly ovate*, very obtuse, rough above, whitened with a soft velvety down underneath, 5–7.5 cm. long. (*Meibomia* Ktze.) — Dry open woods, common, s. N. Y. to Fla., Mich., Mo., and Tex. Fig. 793.

12. **D. Dillènii** Darl. Stem pubescent; *leaflets oblong* or *oblong-ovate*, commonly bluntish, pale beneath, *softly and finely pubescent*, mostly thin, 5–7.5 cm. long. (*Meibomia* Ktze.) — Open woodlands, centr. Me. to Ont., Minn., and southw. Fig. 794.



794. D. Dillenii.

13. **D. paniculàtum** (L.) DC. Essentially *smooth* throughout; stem slender, tall; *leaflets oblong-lanceolate, tapering to a blunt point, thin*, 7.5–12.5 cm. long; racemes much panicled. (*Meibomia* Ktze.) — Copses, s. w. Me. to Ont., Minn., and southw. Fig. 795.



795. D. paniculatum.

Var. **angustifòlium** T. & G. Leaflets narrower, lance-linear. (*Meibomia paniculata*, var. *Chapmani* Britton.) — Va., Ky., and southw.

Var. **pùbens** T. & G. Stem puberulent; leaves sparingly pubescent beneath. (*Meibomia paniculata*, var. Vail.) — N. J. to Kan., and southw.

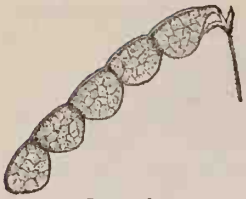
14. **D. strictum** (Pursh) DC. Stem very straight and slender, simple, 6–9 dm. high, the upper part and narrow panicle rough-glandular; *leaflets linear, blunt, strongly reticulated, thickish, very smooth*, 2.5–5 cm. long, 6 mm. wide; joints of the pod 1–3, semi-obovate or very gibbous, only 4 mm. long. (*Meibomia* Ktze.) — Pine woods, N. J. to Fla. and La. Fig. 796.

796. D. strictum.

*** *Stipules small and inconspicuous, mostly deciduous; pods of few roundish or obliquely oval or sometimes roundish-rhomboidal joints 3–5 mm. long.*

— *Stems erect; bracts before flowering conspicuous; racemes densely flowered.*

15. **D. canadénse** (L.) DC. Stem hairy, 5–15 dm. high; *leaflets oblong-*



797. D. canadense.

lanceolate or ovate-lanceolate, obtuse, with numerous straightish veins, *much longer than the petiole*, 3.7–7.5 cm. long; *flowers showy*, larger than in any of our other species, 8–12 mm. long. (*Meibomia* Ktze.) — Open woods and banks of streams, N. B. to N. C., L. Winnipeg, Kan., and Okla. FIG. 797.

16. D. sessilifòlium (Torr.) T. & G. Stem pubescent, 6–12 dm. high; *leaves nearly sessile; leaflets linear* or linear-oblong, blunt, thickish, reticulated, rough above, downy beneath; branches of the panicle long; *flowers small*. (*Meibomia* Ktze.) — Sandy soil, s. e. Mass. to Pa.; and from O. and Mich. to Ill., s. to Miss. and Tex.

← ← *Stems ascending, 3–9 dm. high; bracts small; racemes or panicles elongated and loosely flowered; flowers small.*

17. D. rígidum (Ell.) DC. Stem branching, *somewhat hoary*, like the lower surface of the leaves, with a close roughish pubescence; *leaflets ovate-oblong*, blunt, thickish, reticulated-veiny, rather rough above, *the lateral ones longer than the petiole*. (*Meibomia* Ktze.) — Dry hillsides, s. N. H. and e. Mass. to Fla., Mich., Neb., and La. FIG. 798.

798. D. rigidum

18. D. obtûsum (Muhl.) DC. Stem slender, *hairy or rough-pubescent; leaves crowded, on very short hairy petioles; leaflets round-ovate or oval*, thickish, more or less hairy on the margins and underneath, 1.2–2.5 cm. long. (*D. ciliare* DC.; *Meibomia obtusa* Vail.) — Dry hills and sandy fields, Mass. to Fla., w. to Ont., Mich., Mo., and Tex.

19. D. marilándicum (L.) DC. *Nearly smooth* throughout, slender; *leaflets ovate or roundish*, very obtuse, thin, *the lateral ones about the length of the slender petiole;* otherwise resembling the preceding. (*Meibomia* Ktze.) — Copses, Mass. to Fla., w. to Minn., Mo., and La.

799. D. lineatum.

← ← ← *Stems reclining or prostrate; racemes loosely flowered.*

20. D. lineàtum (Michx.) DC. Stem minutely pubescent, striate-angled; leaflets orbicular, smoothish, 1–2.5 cm. long, much longer than the petiole; pod scarcely stalked in the calyx. (*Meibomia arenicola* Vail.) — Dry soil, Md. and Va. to Fla. and La.; also (?) Erie Co., O. (*Moseley*). FIG. 799.

39. LESPEDÈZA Michx. BUSH CLOVER

Calyx 5-cleft; the lobes nearly equal, slender. Stamens diadelphous (9 and 1); anthers all alike. Pods of a single 1-seeded joint (sometimes 2-jointed, with the lower joint empty and stalk-like), oval or roundish, flat, reticulated. — Herbs with pinnately 3-foliolate leaves, not stipellate. Flowers often polygamous, in summer and autumn. (Dedicated to *Lespedez*, the Spanish governor of Florida in the time of Michaux.)

a. Stipules subulate-setaceous; bracts minute; calyx-lobes attenuate; perennials *b.*
  b. Flowers of 2 kinds; the larger (violet-purple) perfect but seldom fruitful, racemose or panicled; the smaller pistillate and fertile but mostly apetalous, in small sessile clusters or intermixed with the others *c.*
    c. Petaliferous flowers 1–6, on elongate filiform peduncles, which are mostly 2–4 times as long as their subtending leaves.
      Stems soft-downy with short spreading hairs . . . . . 1. *L. procumbens.*
      Stems glabrate or sparingly appressed-pubescent.
        Stems prostrate or trailing; stipules mostly 2–4.5 mm. long . 2. *L. repens.*
        Stems upright; stipules mostly 5–8 mm. long . . . . 3. *L. violacea.*
    c. Petaliferous flowers few-many; peduncles stouter, some or all of them shorter than the leaves *d.*
      d. Many of the peduncles elongate and exceeding their subtending leaves.

Calyx 4-5 mm. long, much shorter than the pod.
Leaflets densely velvety beneath . . . . . 4. *L. Brittonii.*
Leaflets appressed-pubescent or sparingly villous beneath . 5. *L. Nuttallii.*
Calyx 6-9 mm. long, about equaling the pod . . . . 6. *L. Manniana.*
d. Few if any of the peduncles exceeding the leaves *e.*
e. Calyx of the petaliferous flowers 3-5 mm. long, rarely half as long as the pod.
Leaflets densely woolly or velvety beneath . . . . 7. *L. Stuvei.*
Leaflets glabrate or appressed-pubescent beneath.
Leaflets linear to linear-oblong; petaliferous inflorescences mostly sessile or subsessile . . . . . 8. *L. virginica.*
Leaflets oval to oblong; petaliferous inflorescences often short-peduncled . . . . . 9. *L. frutescens.*
e. Calyx of the petaliferous flowers 6-8 mm. long, two thirds as long as the pod . . . . . 10. *L. simulata.*
b. Flowers all alike and perfect, in close spikes or heads; corolla whitish or cream-color, with a purple spot on the standard, about the length of the calyx *f.*
f. Peduncles mostly shorter than the dense subglobose heads; flowers closely appressed-ascending.
Stem pubescent with long spreading or loosely ascending hairs, rarely glabrate; calyx 8-12 mm. long . . . . . 12. *L. capitata.*
Stem short-pubescent with chiefly appressed hairs or glabrate; calyx 5-7 mm. long . . . . . 13. *L. angustifolia.*
f. Peduncles elongate, chiefly equaling the cylindric or subcylindric spikes.
Spikes thick-cylindric, 1-1.5 cm. thick.
Stems with long spreading or loosely ascending pubescence; leaflets oblong to orbicular; flowers spreading or loosely ascending . . . . . 11. *L. hirta.*
Stems chiefly appressed-pubescent or glabrate; leaflets linear to linear-oblong; flowers appressed-ascending . . . . 13. *L. angustifolia.*
Spikes slender-cylindric, 5-8 mm. thick . . . . . 14. *L. leptostachya.*
a. Stipules and bracts broad and scarious; calyx-lobes broad; annual . 15. *L. striata.*

1. **L. procúmbens** Michx. *Stem trailing, prostrate or nearly so, soft-downy* with short spreading hairs; leaflets downy, oval or obovate-elliptical, 6-18 mm. long; peduncles very slender, few-flowered; keel equaling the wings; pod small, roundish. — Dry sandy soil, chiefly near the coast, s. N. H. to Fla. and Tex.; inland in Miss. basin to Mo., Ill., and Ind. Fl. late Aug., Sept.

2. **L. rèpens** (L.) Bart. Like the preceding but more slender and *glabrous or* finely *appressed-pubescent*; stipules subrigid, mostly 2-4.5 mm. long. — Sandy or rocky soil, chiefly near the coast, Ct. to Fla. and Tex., inland in Miss. basin to Ky., Ind., and Minn.; common and said to flower earlier than the preceding.

3. **L. violàcea** (L.) Pers. *Stems upright* or spreading, slender, branched, 2-7 dm. high, rather *sparsely leafy* and sparingly pubescent; stipules setaceous, mostly 5-8 mm. long; *leaflets thin, broadly oval or oblong*, finely appressed-pubescent beneath, those of the stem-leaves mostly 2-5 *cm. long*, 1.2-2.2 *cm. broad; peduncles very slender, loosely few-flowered*, mostly longer than the leaves; petals 6-8 mm. long, the keel often the longest; *pod ovate*, 4-6 mm. long, minutely strigose. — Dry copses, s. N. H. and Vt. to Minn., e. Kan., La., and Fla., chiefly at low altitudes. July-Sept. Var. PRAÍREA Mackenzie & Bush. Principal *leaflets* 1-2 *cm. long*, 0.5-1 *cm. broad.* (*L. prairea* Britton.) — Dry prairies, Mo. and Kan., southw.

4. **L. Brittònii** Bicknell. *Densely cinereous-velvety or -tomentose; stems loosely ascending or arching*, 6-13 *dm. long;* leaves mostly short-petioled, *the thick oblong or lance-elliptic leaflets velvety beneath*, cinereous-pilose or glabrate above, the principal ones 1.5-4 cm. long; inflorescences numerous along the upper half of the stem or on short lateral branches; *peduncles various*, some shorter than the leaves, others elongate; calyx 4-5 mm. long; corolla 6-8 mm. long, pink and purple, the standard deeper purple at base; *pod tomentose*, sharply acute or acuminate — Dry soil, near the coast, e. Mass. to Md.; local and little known.

5. **L. Nuttállii** Darl. *Stems erect*, stoutish, 6-12 dm. high, *villous;* leaves mostly long(1-3 cm.)-petioled, the *oval leaflets* glabrous or glabrate above, *appressed-pubescent or sparingly villous beneath*, the principal ones 2.5-4 cm. long; *peduncles of various lengths; calyx* 4-5 *mm. long, much shorter than the*

narrowly oval *strigose pod.* — Dry rocky woods, s. N. H. to Mich., s. to N. C. and Ky.

6. **L. Manniàna** Mackenzie & Bush. *Erect or ascending*, 3–7 dm. high, the rather slender stems appressed-pubescent or slightly pilose; leaves mostly short (0.5–1.5 cm.)-petioled, the *linear-oblong to narrowly elliptic thick leaflets strigose-pubescent beneath;* peduncles various, many of them elongate; *calyx* 6–9 *mm. long, about equaling the corolla and* the strigose *pod.* — Barrens and dry open woods, Mich. to Kan. and Ark.

7. **L. Stùvei** Nutt. *Stem* upright-spreading, 3–12 dm. high, very leafy, *downy with spreading pubescence*, simple or with few densely flowered *wand-like* branches; *leaves crowded*, short-petioled; *the elliptical* firm *leaflets woolly or velvety beneath* and sometimes above, mostly 1–2.5 *cm. long;* peduncles all short, *the crowded racemes appearing sessile or subsessile;* calyx 3–5 mm. long, much shorter than the *villous-canescent pod.* — Dry soil, e. Mass. and s. Vt. to Mich., and southw. Var. NEGLÈCTA Britton. Leaflets linear or linear-oblong. — N. J. to Mo., and southw.

8. **L. virgìnica** (L.) Britton. *Stems* upright, 3–11 dm. high, *wand-like* or with few erect branches, *minutely appressed-pubescent or glabrate;* leaves very crowded; *the principal* cauline ones with slender rather long petioles, their thickish *linear or linear-oblong leaflets* 1.5–4 *cm. long*, 3–7 *mm. broad, finely appressed-pubescent;* flowers on *very crowded short peduncles;* keel shorter than the standard; *calyx* 3–5 *mm. long*, shorter than the strigose pod. (*L. reticulata* Pers.) — Barrens and dry open woods, s. N. H. to Fla.; and from s. Ont. to Kan., La., and Tex.

9. **L. frutéscens** (L.) Britton. *Stems* erect, slender, 1.5–7 dm. high, *slightly appressed-pubescent or glabrate;* leaves mostly with slender long (1.5–3 cm.) petioles; *the oval to oblong firm leaflets finely appressed-pubescent or glabrate*, those of the cauline leaves 1.5–4 cm. long; peduncles of various lengths, mostly very short, a few sometimes nearly equaling the leaves; *calyx* 3–5 *mm. long*, much shorter than the strigillose pod. (*L. Stuvei*, var. *intermedia* Wats.) — Open rocky woods, etc., s. Me. to Minn., and southw.

L. ACUTICÁRPA Mackenzie & Bush, described from Mo. and Ark., but unknown to us, seems from its description to resemble no. 9, but to have more elongate peduncles.

10. **L. simulàta** Mackenzie & Bush. Stems erect, with few upright branches, rather *stout*, 3–9 dm. high, short-pubescent or glabrate; leaves short-petioled, *the linear-oblong to elliptic firm leaflets appressed-pubescent*, often silvery, those of the cauline leaves 1.5–4 cm. long; *petaliferous flowers in subcapitate sessile or short-peduncled clusters; calyx* 6–8 *mm. long*, nearly equaling the corolla and the strongly pubescent pod. — Dry open woods and plains, Ct. to O., Mo., and southw. — Resembling no. 12.

11. **L. hìrta** (L.) Hornem. Stem with mostly spreading pubescence; *petioles* 4–12 *mm. long; leaflets from orbicular to oblong-ovate*, hairy; *spikes thick-cylindric, on elongated peduncles; pod* (at maturity) oblong-ovate, pubescent, nearly 6 mm. long, *hardly shorter than the calyx.* (*L. polystachya* Michx.) — Dry hills and plains, s. Me. to Ont., Minn., and southw. Var. OBLONGIFÒLIA Britton. Leaflets narrowly oblong. — Pine barrens, N. J. to Fla.

12. **L. capitàta** Michx. *Stems rigid, tomentose* (rarely glabrous or glabrate), 0.6–1.2 m. high; *petioles very short; leaflets oblong to narrowly elliptical*, thickish, reticulated and smooth or silky above, silky beneath; *heads of flowers globular, on peduncles shorter than the leaves; pod oblong-ovate, pubescent, much shorter than the calyx.* — Dry and sandy soil, N. E. to Fla., w. to Minn., Neb., and La. Passing gradually to

Var. **velùtina** (Bicknell) Fernald. Stems and both faces of the leaves *velvety with short dull ashy tomentum.* (*L. velutina* Bicknell; *L. Bicknellii* House.) — N. H. to N. J.

Var. **longifòlia** (DC.) T. & G. *Leaflets* narrower, *lance-oblong to linear, acute*, glabrous above. — Ill. and Mo. to Ky. and La.

13. **L. angustifòlia** (Pursh) Ell. Like the last, but mostly appressed-silky; *leaflets linear; the smaller often short-cylindric heads on distinct and sometimes*

slender peduncles; the pod round-ovate, acutish, 3–4 mm. long, *hardly shorter than the calyx.* — Sandy barrens, e. Mass. to Fla. and La.

14. L. **leptostàchya** Engelm. Clothed with appressed silky pubescence, stems often branched, slender; *leaflets linear* to narrowly oblong; *spikes slender, somewhat loosely flowered*, on peduncles as long as the leaves; *pod ovate*, small (3 mm. long), *about equaling the calyx*, densely pubescent. — Ill., Wisc., Minn., and Ia.

15. L. STRIÀTA (Thunb.) H. & A. *Diffusely branched* decumbent subpubescent *annual;* petioles very short; leaflets oblong-obovate, 1.2 cm. long or less; *peduncles very short*, 1–5-flowered; pod small, little exceeding the calyx. — Roadsides and open soil, D. C. to Mo., and southw. (Nat. from e. Asia.)

40. STYLOSÁNTHES Sw.

Calyx early deciduous; tube slender and stalk-like; limb unequally 4–5-cleft, the lower lobe more distinct. Corolla and monadelphous stamens inserted at the summit of the calyx-tube; standard orbicular; keel incurved. Anthers 10, in two series. Style filiform, its upper part deciduous, the lower incurved or hooked, persistent on the 1–2-jointed short reticulated pod; the lower joint when present empty and stalk-like. — Low perennials, branched from the base, with wiry stems, pinnately 3-foliolate leaves, and small yellow flowers in terminal heads or short spikes. (Name composed of στῦλος, *a column*, and ἄνθος, *a flower*, from the stalk-like calyx-tube.)

1. S. **biflòra** (L.) BSP. Erect or spreading, pubescent and tawny-setose about the few-flowered heads; *leaflets narrowly lanceolate, mostly acute at both ends;* uppermost floral bracts entire; style not quite apical on the fruit. (*S. elatior* Sw.) — Pine barrens and dry soil, near the coast, L. I. and N. J. to Fla. and Tex.; northw. in Miss. basin to Kan., Mo., Ill., and Ind. June–Aug.

Var. **hispidíssima** (Michx.) Pollard & Ball. Stems covered with tawny setose pubescence. (*S. elatior*, var. T. & G.) — Va., Okla., and southw.

2. S. **ripària** Kearney. More slender and decumbent, scarcely setose; stems tomentulose in lines; *leaflets oval or elliptical, obtuse*, mucronulate; uppermost bracts cleft; terminal joint of the loment symmetrical. — Del. to Ala. July, Aug.

41. ZÓRNIA Gmel.

Calyx bilabiate, 5-toothed, the tube not elongated. Corolla yellow. Stamens monadelphous. Ovary sessile. — Prostrate wiry-stemmed perennials with long tough root. (Named presumably for *Johann Zorn*, a German apothecary of the 18th century.)

1. Z. **bracteàta** (Walt.) Gmel. Leaves 4-foliolate. — Sandy fields, s. e. Va. (*Heller*), and southw. (Mex.)

42. VÍCIA [Tourn.] L. VETCH. TARE

Calyx 5-cleft or 5-toothed, the 2 upper teeth often shorter, or the lowest longer. Wings of the corolla adhering to the middle of the keel. Stamens more or less diadelphous (9 and 1); the orifice of the tube oblique. Style filiform, hairy all round or only on the back at the apex. Pod flat, 2-valved, 2–several-seeded. Seeds globular. Cotyledons very thick, remaining under ground in germination. — Herbs, mostly climbing more or less by the tendril at the end of the pinnate leaves. Stipules half-sagittate. Flowers or peduncles axillary. (The classical Latin name.)

Peduncle very short or wanting; flowers few, 1–3 cm. long.
- Annuals; calyx-teeth nearly equaling the tube.
  - Flower 2–3 cm. long . . . . . 1. *V. sativa.*
  - Flower 1–1.8 cm. long . . . . . 2. *V. angustifolia.*
- Perennial; calyx-teeth much shorter than the tube . . . . . 3. *V. sepium.*

Peduncle well developed.
Flowers 1–6, tiny (2–4 mm. long); seeds 2–4; annuals.
Pods glabrous, 4-seeded . . . . . 4. *V. tetrasperma*
Pods hairy, 2-seeded . . . . . 5. *V. hirsuta.*
Flowers usually more numerous, larger; perennials except no. 10.
Smooth or merely appressed-pubescent perennials.
Flowers 6–12 mm. long.
Flowers 2–8; seeds 4–6 . . . . . 6. *V. ludoviciana.*
Flowers more numerous; seeds 6–12.
Flowers 1–1.2 cm. long, blue and purple . . . . . 7. *V. Cracca.*
Flowers barely 1 cm. long, white, the keel tipped with blue . . 8. *V. caroliniana.*
Flowers 1.5–1.8 cm. long . . . . . 9. *V. americana.*
Villous annual or biennial . . . . . 10. *V. villosa.*

1. V. SATÌVA L. (SPRING V.) Annual (or winter-annual), *pubescent*, becoming glabrate; the stem simple or branched at base; leaves essentially uniform; leaflets 4–8 pairs, oblong to oblong-obovate, truncate to emarginate and mucronate at apex, 1.5–3 cm. long, 5–13 mm. broad; *flowers* chiefly in twos in the upper axils, 2–3 *cm. long*, *showy*, purple and rose-color; calyx 1–1.5 cm. long; *pod* pubescent when young, torulose, 4–8 *cm. long*, 7–8 mm. wide. — Cultivated for forage in eastern Canada and occasionally elsewhere, and sometimes persisting or spreading to waste ground. July, Aug. (Introd. from Eurasia.)

2. V. ANGUSTIFÒLIA (L.) Reichard. (COMMON V.) Similar, *glabrous or glabrate; leaflets* 2–5 (rarely 6) pairs, those *of the lower leaves oblong and truncate, of the upper linear- to lance-attenuate*, mucronate, 1.5–3 cm. long, 1–4 mm. broad; *flowers smaller* (1–1.8 *cm. long*); calyx 7–11 mm. long; *pod* 4–5.5 *cm. long*, 5–7 mm. wide, less torulose. — Gravelly waste places, chiefly eastw. May–Sept. (Nat. from Eu.) Var. SEGETÀLIS (Thuillier) Koch. *Leaflets of the upper leaves truncate or emarginate* and mucronate at apex, oblong to oblong-obovate, 2–8 mm. broad. (*V. sativa* Man. ed. 6, not L.) — Roadsides, waste places, etc., common. (Nat. from Eu.)

3. V. SÈPIUM L. *Perennial;* leaflets 5–8 pairs, elliptic-ovate; *flowers* 3–4, *in subsessile racemes;* pod oblong, obliquely acuminate, many-seeded. — Locally in fields and waste places, Me. to Ont. June, July. (Nat. from Eu.)

4. V. TETRASPÉRMA (L.) Moench. *Peduncles* 1–2-*flowered;* leaflets 4–6 pairs, linear-oblong, obtuse; calyx-teeth unequal; corolla bluish; *pods narrow*, 4-*seeded*, *smooth*. — Waste places, e. Que. to Ont., Fla., and Miss. May–Sept. (Nat. from Eu.)

5. V. HIRSÙTA (L.) S. F. Gray. *Peduncles* 3–6-*flowered;* leaflets 6–8 pairs, truncate; calyx-teeth equal; corolla whitish; *pods oblong*, 2-*seeded*, *hairy*. — Waste places, e. Que. to Ont. and Ga. May–Aug. (Nat. from Eu.)

6. V. ludoviciàna Nutt. *Peduncles* $\frac{2}{3}$–$1\frac{1}{2}$ times as long as the leaves, 2–8-*flowered;* leaflets 7–11, elliptical to oblong; *flowers* 6–8 *mm. long*, blue or purple. — Greene Co., Mo. (*Blankinship*), and southw. Apr., May.

7. V. Crácca L. Appressed-pubescent; *leaflets* 8–24, *oblong-lanceolate*, *strongly mucronate; racemes densely many-flowered*, 1-sided; flowers blue, turning purple (rarely white), 1–1.2 cm. long, reflexed; calyx-teeth shorter than the tube. — Borders of thickets or in fields, Nfd. to N. J., w. to Ky., Ia., and Minn. June–Aug. (Eu.)

8. V. caroliniàna Walt. Nearly smooth; *leaflets* 8–24, *oblong*, *obtuse*, *scarcely mucronate; peduncles loosely flowered;* flowers small, more scattered than in the preceding, whitish, the keel tipped with blue; calyx-teeth very short. — River-banks, Ont. to Ga., Minn., and Kan. Apr.–June.

9. V. americàna Muhl. *Glabrous; leaflets* 10–14, *elliptical or ovate-oblong*, very obtuse, many-veined; *peduncles* 4–8-*flowered;* flowers purplish (1.5–1.8 cm. long). — Moist soil, N. Y. to Va., Minn., Kan., and westw. May, June. Var. TRUNCÀTA (Nutt.) Brewer. Leaflets conspicuously truncate. — Reported from e. Kan. Var. ANGUSTIFÒLIA Nees. Leaflets linear. (Var. *linearis* Wats.) — Minn., westw. and southw.

10. V. VILLÒSA Roth. (HAIRY OR WINTER V.) Resembling *V. Cracca*, but *annual or biennial; the stems*, *peduncles*, *and leaves villous;* the violet and white flowers larger. — Frequently planted for fodder, and inclined to persist or escape into dry open soil. May–Sept. (Introd. from Eurasia.)

43. LÁTHYRUS [Tourn.] L. Vetchling. Everlasting Pea

Style dilated and flattish (not grooved) above, hairy along the inner side (next the free stamen). Sheath of the filaments scarcely oblique at the apex. Otherwise nearly as in *Vicia*.—Our species perennial and mostly smooth plants. (Λάθυρος, a leguminous plant of Theophrastus.)

Stipules broadly ovate, regularly halberd-shaped . . . . . 1. *L. maritimus.*
Stipules semi-cordate, semi-sagittate, or with unequal sides.
  Flowers purple or purplish to pink or white.
    Leaflets 4–12.
      Principal leaves with 4–8 leaflets; flowers 2–8 . . . . . 2. *L. palustris.*
      Principal leaves with 8–12 leaflets; flowers 10–25 (rarely as few as 6) . 3. *L. venosus.*
    Leaflets 2.
      Stems and petioles winged . . . . . 5. *L. latifolius.*
      Stems and petioles slender and wingless . . . . . 6. *L. tuberosus.*
  Flowers yellow or yellowish.
    Leaflets 4–6; flowers yellowish-white . . . . . 4. *L. ochroleucus.*
    Leaflets 2; flowers bright yellow . . . . . 7. *L. pratensis.*

1. **L. marítimus** (L.) Bigel. (Beach Pea.) Stout, trailing or climbing, 0.3–1 m. high; *stipules nearly as large as the leaflets*, the lower lobe larger and usually coarsely toothed; *leaflets* mostly 6–10, *thick*, ovate-oblong, 2–6 cm. long; peduncles a little shorter than the leaves, 6–10-flowered; *flowers large* (1.8–2.5 cm. long), *purple.*—Seashores from N. J. and Ore. to the Arctic Sea; also on Oneida L., N. Y., and the Great Lakes. June–Sept. (Eurasia.)

2. **L. palústris** L. *Slender, glabrous*, the usually *winged stems* 0.5–1 m. high; *stipules* obliquely lanceolate to ovate, *sharp-pointed at both ends; leaflets* 3–4 (rarely 5) pairs, mostly 3.5–7 *cm. long, lanceolate to elliptic*, rather firm; *peduncles* 3–5(*rarely* 8)-*flowered; flowers* purple, 1.6–2.5 *cm. long.*—Banks of rivers and lakes, Que. to Alaska, s. to Me., Vt., w. N. Y., and the Great L. region. June–Aug. (Eurasia.) Var. pilòsus (Cham.) Ledeb. Lower surface of leaves, peduncles, calyces, etc., *pubescent.* (*L. myrtifolius*, var. *macranthus* T. G. White.)—Nfd. and e. Que. to e. Me. (E. Asia.)

Var. **linearifòlius** Ser. Stems winged, 2–7 cm. high; *leaflets* 2–3 (rarely 4) pairs, *linear to lanceolate*, firm; peduncles 2–5-flowered; *flowers* 1.4–1.7 *cm. long.*—Meadows (often brackish), shores, and open woods, Nfd. to Alaska, s. to R. I., w. N. Y., and Minn.

Var. **myrtifòlius** (Muhl.) Gray. *Stems very slender, wingless*, 0.3–1 m. high; stipules sometimes broader; *leaflets* 2–3 pairs, elliptical, thinner, mostly 2–4 *cm. long;* peduncles 3–9-flowered; *flowers* 1–1.5 *cm. long.* (*L. myrtifolius* Muhl.)—By lakes and streams, w. Que. to Man., s. to N. C. and Tenn.

3. **L. venòsus** Muhl. *Stout*, climbing, usually somewhat downy; stipules very small and mostly slender; *leaflets* 4–6 *pairs, oblong-ovate*, mostly obtuse, about 5 cm. long; *peduncles many-flowered;* flowers 1.2–1.6 cm. long.—Shady banks, N. J. and Pa. to the Sask., and southw. May–July.

4. **L. ochroleùcus** Hook. Stem slender, 3–9 dm. high; *stipules semicordate, half as large as the thin ovate leaflets;* peduncles 7–10-flowered; *flowers* 1.5–1.8 cm. long, *yellowish-white.*—Hillsides, w. Que. to Sask., s. to N. J., Pa., Great L. region, Ia., S. Dak., and Wyo. May–July.

5. **L.** latifòlius L. (Everlasting or Perennial Pea.) Tall perennial with *broadly winged stems; leaves and stipules coriaceous and veiny; petioles mostly winged;* the 2 elliptic to lanceolate *leaflets* 0.5–1 *dm. long;* peduncles stiff, many-flowered; flowers showy, pink, purple, or white.—Frequently cultivated, and escaping to roadsides and thickets, Ct. to D. C. (Introd. from Eu.)

6. **L.** tuberòsus L. Slender perennial; the rootstocks bearing numerous tubers; stems glabrous; *leaves and stipules thin; petioles and tendrils filiform;* the 2 oblong *leaflets* 2–3.5 *cm. long;* peduncles filiform, 3–6-flowered; the *fragrant violet flowers* about 1.5 cm. long.—Fields and meadows, locally established in Vt. and Ont. June–Aug. (Introd. from Eurasia.)

7. **L.** praténsis L. Low and straggling; the 2 bright green leaflets narrowly

lanceolate to linear, acute; peduncles 4–9-flowered; the *yellow flowers* 1.5–2 cm. long. — Fields and waste places, local, N. B. to N. Y. and Ont. June–Aug. (Nat. from Eu.)

44. ÀPIOS [Boerh.] Ludwig. Groundnut. Wild Bean

Calyx somewhat 2-lipped, the 2 lateral teeth being nearly obsolete, the upper very short, the lower one longest. Standard very broad, reflexed; the long scythe-shaped keel strongly incurved, at length coiled. Stamens diadelphous. Pod straight or slightly curved, linear, elongated, thickish, many-seeded. — Perennials, twining and climbing over bushes; the rootstocks with tuberous enlargements. Leaflets 3–9, ovate-lanceolate, obscurely stipellate. Flowers in dense and short often branching racemes. (Name from ἄπιον, *a pair*, from the shape of the tubers.)

1. A. tuberòsa Moench. *Rootstocks moniliform, the tuberous enlargements numerous; flowers brown-purple*, violet-scented; *standard unappendaged* at the summit. (*A. Apios* MacM.) — Thickets, N. B. to Fla., Minn., Kan., and La. July–Sept.

2. A. Priceàna Robinson. *Tuber solitary*, very large; *flowers pale rose-color; standard bearing a fleshy knob at the apex.* — Woods and thickets, Warren Co., Ky. (*Miss S. F. Price*). July–Sept.

45. PHASÈOLUS [Tourn.] L. Kidney Bean

Calyx 5-toothed or 5-cleft, the two upper teeth often shallower. Stamens diadelphous. Stigma oblique or lateral. Pod scythe-shaped, several–many-seeded, tipped with the hardened base of the style. Cotyledons thick and fleshy, rising out of the ground nearly unchanged in germination. — Twining herbs, with pinnately 3-foliolate stipellate leaves. Flowers racemose, produced in summer and autumn. (The ancient name of the Kidney Bean.)

1. P. polystàchyus (L.) BSP. (Wild Bean.) Perennial; leaflets roundish-ovate, short-pointed; flowers purple, handsome, but small; pods drooping, 4–5-seeded. (*P. perennis* Walt.) — Copses, chiefly near the coast, Ct. to Fla. and La.; northw. in Miss. basin to Mo., Ill., and Ind.; reported northw. to Minn. and Neb. July–Sept.

46. VÍGNA Savi

Habit and floral characters nearly as in *Phaseolus*, but the keel merely arcuate not spirally coiled at the tip. — Twining herbs, with pinnately 3-foliolate leaves. (Dedicated to *Dominico Vigna*, Italian scientist of the 17th century.)

1. V. sinénsis (L.) Endl. (Cow Pea.) Annual; leaflets broadly ovate, often very oblique or sometimes slightly contracted above an obtusely hastate base; flowers few, loosely subcapitate at the end of the long stiffish peduncle; pods 1–2 dm. long. (*V. Catjang* Walp.) — Cultivated, and tending to escape, Mo. (*Bush*), s. to the Gulf. (Introd. from Asia.)

47. STROPHOSTÝLES Ell.

Keel of the corolla with the included stamens and style elongated, strongly incurved, not spirally coiled. Pod linear, terete or flattish, straight or nearly so. Seeds quadrate or oblong with truncate ends, mealy-pubescent or glabrate; hilum linear. Otherwise as *Phaseolus*. — Stems prostrate or climbing, more or less retrorsely hairy. Stipules and bracts striate. (Name from στροφή, *a turning*, and στῦλος, *a style*.)

1. S. hélvola (L.) Britton. *Annual;* stems branched, 0.3–2 m. long; leaflets ovate to oblong-ovate (rarely linear-oblong), *with a more or less prominent rounded lobe toward the base* (*the terminal 2-lobed*), or some or all often entire,

1.2–4 cm. long; corolla greenish-white and purplish; pod terete, 5–7.5 cm. wide, 4–8-sceded, nearly glabrous; *seeds oblong, about 6 mm. long*, usually very pubescent. (*S. angulosa* Ell.) — Sandy shores and river-banks, coast of Mass. and southw.; along the Great Lakes to Minn., and s. to Kan. and Tex. June–Sept.

Var. missouriénsis (Wats.) Britton. Climbing high (3–10 m.); leaflets often 8 cm. long, rhombic-ovate, rarely at all lobed; seeds 6–8 mm. long. — River bottoms, D. C., Ill., Mo., and Kan. Flowering somewhat later.

2. S. umbellàta (Muhl.) Britton. Stems *more slender*, 6–12 dm. long, from a *perennial* rootstock; leaflets ovate to oblong-linear, *rarely at all lobed*, 2.5 cm. long or less; *pod* 3.5–5 cm. long, *scarcely 4 mm. wide; seeds much smaller*, short-oblong to quadrate. (*S. peduncularis* Ell.) — Damp sandy ground, L. I. to Fla. and Tex.; northw. in Miss. basin to s. Ind. Sept., Oct.

3. S. pauciflòra (Benth.) Wats. *Annual*, slender, low-climbing, pubescent; leaflets oblong-lanceolate or ovate-oblong to linear, not lobed, 2.5 cm. long; pod pubescent, 2–3 cm. long, flattish; seeds as in the last, very finely mealy, soon glabrate. — River-banks, Ind. to Minn., Kan., Tex., and Miss. July, Aug.

48. CLITÒRIA L. Butterfly Pea

Standard much larger than the rest of the flower, erect, rounded, notched at the top, not spurred on the back; keel small, shorter than the wings, incurved, acute. Stamens monadelphous below. Pod linear-oblong, flattish, knotty, several-seeded, pointed with the base of the style. — Erect or twining perennials, with mostly pinnate 3-foliolate stipellate leaves, and very large flowers. Peduncles 1–3-flowered; bractlets opposite, striate. (Derivation recondite.)

1. C. mariàna L. Low, ascending or twining, smooth; leaflets oblong-ovate or ovate-lanceolate; stipules and bracts awl-shaped; peduncles short; the showy pale blue flowers 5 cm. long. — Dry banks, N. J. to Fla. and Tex., northw. in Miss. basin to Ill. and Mo. June–Aug.

49. CENTROSÈMA (DC.) Benth.

Corolla, etc., much as in *Clitoria*, but the spreading standard with a spur-shaped projection on the back near the base; keel broad. Pod long and linear, flat, pointed with the awl-shaped style, many-seeded, thickened at the edges, the valves marked with a raised line on each side next the margin. — Twining perennials, with 3-foliolate stipellate leaves, and large showy flowers. (Name from κέντρον, *a spur*, and σῆμα, *a standard*.) Bradburya Raf.

1. C. virginiànum (L.) Benth. Rather rough with minute hairs; leaflets varying from oblong-ovate to lanceolate and linear, very veiny, shining; peduncles 1–4-flowered; calyx-teeth linear-awl-shaped; corolla violet, 2.5 cm. long; pods straight, 1–1.2 dm. long. — Sandy woods, "N. J." and Md. to Fla., Ark., and Tex. July, Aug.

50. DÓLICHOS L.

Calyx bell-shaped, with deltoid teeth, the upper pair united nearly or quite to the apex. Standard orbicular, with incurved auricles at base. Flowers fasciculate-racemose. Pods linear and falcate, or oblong-lunate, compressed; seeds several. (The Greek δολιχός, *long*, a word also employed by Theophrastus as the name of some kind of pulse.)

1. D. Làblab L. (Hyacinth Bean.) Stoutish twining annual, 3–6 m. in length; leaflets large, deltoid-ovate; flowers purple; pods 2 cm. broad. — Often cultivated for ornament and in tropical countries for its seeds; tending to escape, D. C. to O. (Introd. from India.)

51. AMPHICÁRPA Ell. Hog Peanut

Flowers of 2 (or 3) kinds; those of the racemes from the upper branches perfect; those near the base and on filiform creeping branches with the corolla

none or rudimentary, and few free stamens, but fruitful; reduced flowers of slightly different form sometimes also on aërial racemes. Calyx about equally 4(rarely 5)-toothed. Stamens diadelphous. Pods of the upper flowers, when formed, somewhat scimiter-shaped, stipitate, 3–4-seeded; of the lower ones commonly subterranean and fleshy, obovate or pear-shaped, ripening usually but one large seed. — Low and slender perennials; the twining stems clothed with brownish hairs. Leaves pinnately 3-foliolate; leaflets rhombic-ovate, stipellate. Petals purplish. Bracts persistent, round, partly clasping, striate, as well as the stipules. (Name from ἀμφί, *both*, and καρπός, *fruit*, in allusion to the two kinds of pods.) FALCATA Gmel.

1. **A. monoíca** (L.) Ell. Leaflets thin, 1.3–5 cm. long; racemes nodding; calyx of the upper flowers 4 mm. long; the ovary glabrous except the mostly appressed hairy margin; pod 2.5 cm. long; ovary and pod of the rudimentary flowers hairy. (*Falcata comosa* Am. auth.; *Glycine comosa* L. ?) — Rich damp woodlands, common. Aug., Sept.

2. **A. Pitchèri** T. & G. Leaflets usually 5–10 cm. long; rhachis of the racemes usually villous; calyx 6 mm. long, the teeth acuminate; pod sometimes hairy on the valves, the margins retrorse-hispid. (*Falcata* Ktze.) — Rich woods and thickets, near the coast, Mass. to D. C.; and from w. N. Y. to S. Dak., s. to La. and Tex. July–Sept.

52. GALÁCTIA P. Br. MILK PEA

Keel scarcely incurved. Stamens diadelphous or nearly so. Pods linear, flat, several-seeded (a few of them rarely subterranean and fleshy or deformed). — Low mostly prostrate or twining perennial herbs. Leaflets usually 3, stipellate. Flowers in somewhat interrupted or knotty racemes, purplish; in summer. (Name from γάλα, *milk;* some species being said to yield a milky juice, which is unlikely.)

1. **G. regulàris** (L.) B S P. *Stems nearly smooth*, prostrate; leaflets elliptical or ovate-oblong, sometimes slightly hairy beneath; racemes short, 4–8-flowered; *pods somewhat hairy.* (*G. glabella* Michx.) — Sandy woods, near the coast, s. N. Y. to Fla. and Miss.; locally northw. in Miss. basin to Kan. July, Aug.

2. **G. volùbilis** (L.) Britton. *Stems* decumbent and somewhat twining, *hoary-pubescent; leaves glabrous above, soft-downy and hoary beneath;* leaflets oval; racemes many-flowered; *pods very downy.* (*G. pilosa* Ell.) — Dry soil, near the coast, L. I. to Fla. and Tex. Var. MISSISSIPPIÉNSIS Vail. Leaves pubescent above. — Miss. basin, from Mo. southw.

53. RHYNCHÒSIA Lour.

Stamens diadelphous. Ovules only 2. Pod 1–2-seeded, flat, 2-valved. — Perennial herbs, with leaves pinnately 3-foliolate, or with a single leaflet, not stipellate. Flowers yellow, racemose or clustered. (Name from ῥύγχος, *a beak*, from the shape of the keel.)

* *Stem elongated, trailing or twining; leaflets* 3.

1. **R. tomentòsa** (L.) H. & A. *Trailing and twining;* the stem and leaves more or less *pubescent with spreading hairs; leaflets* 3, *roundish or round-rhombic*, acute or acutish; *racemes short*, few-flowered, almost *sessile;* calyx 8–10 mm. long, about equaling the corolla, 4-parted, the upper lobe 2-cleft; pod oblong. — Dry soil, Va. to Fla. and Tex.

2. **R. latifòlia** Nutt. Soft-pubescent; *leaflets large, ovate*, rounded at the base; *racemes long*, many-flowered, equaling or usually exceeding the leaves; calyx-lobes lance-linear, 1.1–1.3 cm. long, equaling the corolla. — Mo. (*Bush*) to La. and Tex.

* * *Erect; stem shorter.*

3. **R. erécta** (Walt.) DC. Stem (3–6 dm. high) and leaves *more or less tomentose; leaflets* 3, *oval to oblong*, obtuse or acutish; racemes short and shortly pedunculate. — Dry soil, Del. to Fla. and Miss.

4. **R. simplicifòlia** (Walt.) Wood. *Dwarf* (1–2 dm. high); *pubescence spreading; leaflets solitary* (rarely 3), *round-reniform*, very obtuse or apiculate; racemes few-flowered, sessile in the axils. (*R. reniformis* DC.) — Va. to Fla. and Miss.

LINÀCEAE (Flax Family)

Herbs (rarely shrubs) with the regular and symmetrical hypogynous flowers 4–6-merous throughout, strongly imbricated calyx and convolute petals, 5 stamens monadelphous at base, and an 8–10-seeded pod having twice as many cells as there are styles.

1. **Linum.** Flowers 5-merous.
2. **Millegrana.** Flowers 4-merous.

1. LÌNUM [Tourn.] L. Flax

Sepals (persistent), petals, stamens, and styles 5, regularly alternate with each other. Pod of 5 united carpels (into which it splits in dehiscence), 5-celled, with 2 seeds hanging from the summit of each cell, which is partly or completely divided into two by a false partition projecting from the back of the carpel, the pod thus becoming 10-celled. Seeds anatropous, mucilaginous, flattened, containing a large embryo with plano-convex cotyledons. — Herbs, with tough fibrous cortex, simple and sessile entire leaves, without stipules, but often with glands in their place, and with corymbose or panicled flowers. Corolla usually ephemeral. (The classical name of the Flax.)

Petals blue, large (1 cm. or more in length); capsule 10–12 mm. in diameter.
- Annuals; stigmas elongated.
  - False septa of the capsule not ciliate . . . . . 1. *L. usitatissimum.*
  - False septa of the capsule ciliate . . . . . 2. *L. humile.*
- Perennial; stigmas scarcely longer than broad . . . . . 3. *L. Lewisii.*

Petals yellow or white; capsule 3–6 mm. in diameter.
- Petals more than 1 cm. long; western . . . . . 4. *L. rigidum.*
- Petals 4–8 mm. long.
  - False septa very incomplete, conspicuously ciliate.
    - Petals white; leaves chiefly opposite; fruiting pedicels 4–10 mm. long . . . . . 5. *L. catharticum.*
    - Petals yellow; leaves chiefly alternate; pedicels 1–3 mm. long . . 6. *L. sulcatum.*
  - False septa nearly complete, not ciliate.
    - Stem-leaves chiefly opposite; branches striate-angulate . . . 7. *L. striatum.*
    - Stem-leaves chiefly alternate; branches subterete.
      - Capsule depressed-globose.
        - Leaves oblong or lance-oblong, deep green; flowering branches filiform, flexuous, ascending-spreading . . . . . 8. *L. virginianum.*
        - Leaves narrowly lanceolate, dull or pale green; flowering branches slightly rigid and fastigiate . . . . . 9. *L. medium.*
      - Capsule globose-ovoid . . . . . 10. *L. floridanum.*

1. **L. usitatíssimum** L. (Common F.) Erect *annual;* stem 3–5 dm. high, corymbosely branched at top; *sepals acute, ciliate;* fruit nearly indehiscent, its *septa not ciliate.* — Occasionally spontaneous in fields and on roadsides. (Introd. from Eu.)

2. **L. humile** Mill. Similar but of lower growth; capsule dehiscent, its *septa ciliate.* — Similar situations. (Introd. from Eu.)

3. **L. Lewísii** Pursh. *Perennial*, glabrous and glaucous, 3–9 dm. high; leaves linear, acute; flowers rather few on long peduncles; *sepals obtuse* or acutish, *not glandular-serrulate;* styles distinct; pod ovoid. — Plains, Wisc. to Tex. and Alaska.

4. **L. rígidum** Pursh. Glaucous, sometimes slightly puberulent, often low and cespitose, the *rigid branches angled; leaves* narrow, erect, usually *with stipular glands; flowers large;* sepals lanceolate, glandular-serrulate; styles united; capsule ovoid, 5-valved. — Dry soil, Sask. and Minn. to Kan., and southwestw. (Mex.)

5. **L. cathárticum** L. *Delicate annual*, 1–2 dm. high, corymbosely branched; *leaves* small (3–8) mm. long), elliptic-oblanceolate, *obtuse.* — Old fields, etc., N. S. and Ont. (Adv. from Eu.)

6. **L. sulcàtum** Riddell. Annual; *branchlets grooved; leaves linear or subulate*, commonly with *dark glands in the place of stipules;* sepals ovate-lanceolate, conspicuously pointed, glandular-ciliate. — Dry or sandy soil, e. Mass. and Vt. to Man., and southwestw.

7. **L. striàtum** Walt. Erect from a slightly decumbent base; *flowers* small, somewhat *crowded on the stiffish* spreading-ascending *angulate branches.* — Wet woods, sandy shores, etc., Mass. to Ga., Mo., and Tex. — The fruiting plant has much the habit of *Lechea.*

8. **L. virginiànum** L. Tall, 3–5 dm. high; stem and *branches subterete, leaves thin, deep green*, elliptic-lanceolate or narrowly oblong, the lower spatulate and often opposite, chiefly *spreading-ascending;* flowers scattered on a few often subsimple branches; *sepals* ovate, short-pointed, *nearly or quite entire; capsule depressed-globose.* — Dry woods and barrens, s. Me. to Ga., Ky., and s. Ont.

9. **L. mèdium** (Planch.) Britton. *Leaves* of *firm* texture, acute, *erect or ascending;* pedicels short (1–7 mm. long); the *inner sepals* commonly *erose or somewhat glandular-ciliolate; capsule depressed-globose.* — Dry or sandy soil, Vt. to Ont. and Mich., southw. and southwestw.

10. **L. floridànum** (Planch.) Trel. Similar to the preceding, *perennial; leaves firm, erect, pale*, narrowly lanceolate to oblong, acute; branches few, slender, arched-ascending; sepals glandular-ciliate on the covered margins; *capsule ovoid, pointed.* — Bogs and sterile soil, e. Mass. to Fla.

2. MILLEGRÀNA Adans. All-seed

Sepals (toothed), petals, stamens, and styles 4. Pod of 4 almost 2-celled carpels, each carpel 4-seeded. Seeds without albumen. — A minute annual with filiform simple stems or forking branches, opposite leaves, and tiny corymbiform cymes. Corolla fugacious. (Name from *mille*, thousand, and *granum*, seed.) Radiola Roth.

1. **M.** Radìola (L.) Druce. The only species. (*Radiola Linoides* Roth.) — Ditches, Louisburg, Cape Breton (*Macoun*). (Nat. from Eu.)

OXALIDÀCEAE (Wood Sorrel Family)

Plants with regular 5-merous 10–15-androus flowers. Ovary superior, 5-celled, the carpels 2–∞-ovuled, usually distinct above, loculicidal. — Ours low herbs with sour watery juice and delicate impunctate palmate alternate or radical leaves with 3 obcordate leaflets.

1. ÓXALIS L. Wood Sorrel

Sepals 5, persistent. Petals 5, sometimes united at base, withering after expansion. Stamens 10, usually monadelphous at base, alternately shorter. Styles 5, distinct. Pod prismatic, cylindric, or awl-shaped, membranaceous; valves persistent, being fixed to the axis by the partitions. Seeds pendulous from the axis, anatropous, their outer coat loose and separating. Embryo large and straight in fleshy albumen; cotyledons flat. — Several species produce small peculiar flowers, precociously fertilized in the bud and particularly fruitful; and the ordinary flowers are often dimorphous or even trimorphous in the relative length of the stamens and styles. (Name from ὀξύς, *sour.*)

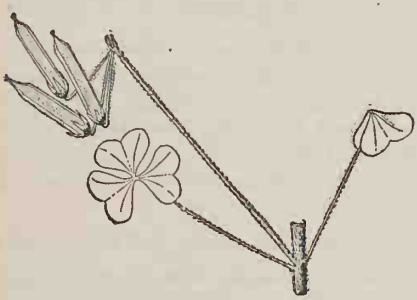
N. B. — In this genus the figures are on the scale of ⅔.

Stemless; petals white or purple.
  Rootstock creeping; scapes 1-flowered . . . . . 1. *O. Acetosella.*
  Bulbose; scapes umbellately several-flowered . . . . . 2. *O. violacea.*
Caulescent; petals yellow.
  Flowers large; petals 1.4–2 cm. long; Pa. and southward.
    Petals hairy on the margin; leaflets 8–15 mm. broad . . . . . 3. *O. Priceae.*
    Petals essentially glabrous; leaflets 2–4 cm. broad . . . . . 4. *O. grandis.*
  Flowers smaller; petals 8–12 mm. long.
    Stems erect or decumbent but not extensively creeping.
      Peduncles mostly 2-flowered; pedicels appressed-pubescent or strigillose, deflexed in fruit.
        Stem covered with closely appressed short hairs . . . . . 5. *O. stricta.*
        Stem covered with loose spreading woolly pubescence . . . . . 6. *O. filipes.*
      Peduncles mostly several-flowered; pedicels ascending or widely divergent, their pubescence sparse, spreading . . . . . 7. *O. corniculata.*
    Stems prostrate, elongated, rooting at the nodes . . . . . 8. *O. repens.*

1. O. Acetosélla L. (Common W.) *Creeping;* leaves radical; *scapes 1-flowered,* 5–15 cm. high; petals white, with rose-colored or purple veins. — Deep woods, N. S. and e. Que. to Sask., s. to N. E., N. Y., and in the mts. to N. C. (Eu.) Var. subpurpurascens DC., with petals rose-colored or purple, has been found at Chesterville, Me. (*Miss Eaton*), and at Manchester, Vt. (*Grout*). (Eu.)

2. O. violàcea L. (Violet W.) Nearly glabrous; *base bulbous,* scaly; leaves radical; *scapes* umbellately *several-flowered,* 1.2–2.5 dm. high, exceeding the leaves; *petals violet.* — Rocky places and open woods, e. Mass to Minn. and southw.

3. O. Príceae Small. Caulescent; stems erect, *soft-villous,* from a long slender dark-colored rootstock; leaflets 8–12 mm. broad; pedicels in 2's or 3's at the ends of long slender peduncles, deflexed in fruit; *petals yellow, ciliate.* — Bowling Green, Ky. (*Miss Price*); and Ala.



800. O. stricta.

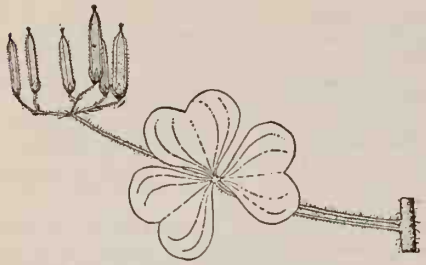
4. O. grándis Small. *Tall* (3–4.6 dm. high), *smoothish or covered with soft spreading pubescence; leaflets large* (often 3.5–4.1 cm. broad), frequently brownish-purple at the margin; long-peduncled inflorescences 3–several-flowered; *petals yellow,* 1.4–1.8 cm. long, *not ciliate.* — Sandy woods and alluvial soil, Pa. to Ill. and southw. May–Aug.

5. O. stricta L. *Pale green, appressed-pubescent or strigose;* stems usually several, decumbent, stoutish; stipules evident; *pedicels* 1–4 (*mostly* 2), *subumbellate* at the end of the peduncle, *at length deflexed;* the fruit large, columnar, short-pointed, 15–23 mm. long. — Dry or sandy soil, s. Me. to Dak. and southw., common. — The petals pale yellow, often with a reddish spot near the base. Fig. 800.

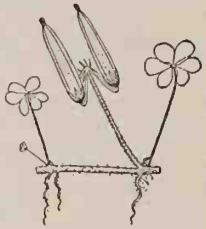
6. O. filipes Small. Very slender, *pubescence* of the stem *loose and spreading;* petioles and *peduncles filiform,* elongated; umbels chiefly 2-flowered; petals yellow. (*O. Brittonae* Small.) — Sandy soil, s. Me. (*Chamberlain & Collins*) to n. N. Y., Ct., Fla., and Tex. Fig. 801.

801. O. filipes.

7. **O. corniculàta** L. (Lady's Sorrel.) *Erect* or decumbent, apparently flowering the first year but perennial by *numerous slender pale runners;* leaflets green or often purplish; *pedicels* subumbellately or *at length cymosely arranged* at the summit of the peduncle, *ascending*, sparingly pubescent, *the hairs spreading;* petals yellow. (*O. cymosa, Bushii,* & *rufa* Small; *O. stricta* of many auth., not L.) — Dry or moist open soil, a very common weed. (Eu.) Fig. 802.



802. O. corniculata.



803. O. repens.

8. **O. rèpens** Thunb. *Stems* several, *prostrate* and creeping, the numerous erect branches low, *seldom* 1 *dm. high;* leaflets small; flowers small, 2–5 on very short at length *deflexed pedicels.* (*O. corniculata* of L., in part, and of many later authors.) — A weed, chiefly in and about greenhouses. (Cosmopolitan.) Fig. 803.

GERANIÀCEAE (Geranium Family)

Plants with perfect regular 5-merous hypogynous flowers. Sepals imbricated in the bud, persistent. Glands of the disk 5, *alternate with the petals. Stamens, counting the sterile filaments, as many or commonly twice as many as the sepals. Ovary deeply lobed; carpels* 2-*ovuled,* 1-*seeded, separating elastically with their long styles, when mature, from the elongated axis.* Cotyledons plicate, incumbent on the radical. — Our species herbs with lobed or divided stipulate leaves, and astringent roots.

1. **Geranium.** Stamens with anthers 10, rarely 5. The recurving bases of the styles or tails of the carpels in fruit naked inside.
2. **Erodium.** Stamens with anthers only 5. Tails of the carpels in fruit bearded inside, often spirally twisted.

1. GERÀNIUM [Tourn.] L. Cranesbill

Stamens 10 (rarely 5), all with perfect anthers, the 5 longer with glands at their base (alternate with the petals). Styles smooth inside in fruit when they separate from the axis. — Stems forking. Peduncles 1–3-flowered. (An old Greek name, from γέρανος, *a crane;* the long fruit-bearing beak thought to resemble the bill of that bird.)

Perennials with stoutish caudex and tough fibrous roots.
- Petals more than 1 cm. long.
  - Pedicels puberulent but not glandular; petals light purple . . . . 1. *G. maculatum.*
  - Pedicels glandular-puberulent; petals deep purple . . . . . 2. *G. pratense.*
- Petals less than 1 cm. long.
  - Sepals strongly awned; flowers mostly solitary . . . . . 3. *G. sibiricum.*
  - Sepals merely pointed; flowers in pairs . . . . . 5. *G. pyrenaicum.*

Annuals or biennials; flowers small; petals not over 1 cm. long.
- Petals about 1 cm. long, twice the length of the sepals.
  - Petals entire; leaves ternately dissected . . . . . 4. *G. Robertianum.*
  - Petals deeply retuse; leaves palmately lobed . . . . . 5. *G. pyrenaicum.*
- Petals less than 1 cm. long, 1-1½ times the length of the sepals.
  - Fertile part of the carpel pubescent.

Fruit 1.7–2.4 cm. long; seeds pitted.
Flowers crowded . . . . . 6. *G. carolinianum.*
Inflorescence lax . . . . . 7. *G. Bicknellii.*
Fruit 1–1.5 cm. long.
Seeds pitted; sepals short-awned . . . . . 8. *G. rotundifolium.*
Seeds smooth; sepals awnless . . . . . 9. *G. pusillum.*
Fertile part of the carpel essentially glabrous.
Pedicels 8–15 mm. long . . . . . 10. *G. molle.*
Pedicels 3–6 cm. long . . . . . 11. *G. columbinum.*

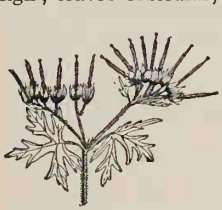
1. **G. maculàtum** L. (Wild C.) Erect, hairy; *leaves* about 5-*parted*, the wedge-shaped divisions lobed and cut at the end; sepals slender-pointed; *pedicels and beak* of fruit *hairy* but *not glandular;* petals entire, light purple, bearded on the claw. — Open woods and fields, centr. Me. to Man., and southw. Apr.–July.

2. **G. praténse** L. Tall (7 dm. high); *leaves* mostly 7-*parted*, the narrow lobes incised; *pedicels and beak glandular-pubescent;* petals deep purple. — Fields and meadows, n. e. Me., N. B., and Que.; also locally, e. Mass. (Introd. from Eu.)

3. **G. sibíricum** L. *Weak, diffusely branched;* stem leafy; *leaves* 3(–5)-*parted*, the segments broadly lanceolate or rhombic, sharply cut-toothed, acute; carpels finely pubescent; *seeds lineolate.* — Said to be established on Manhattan I. (Adv. from Eurasia.)

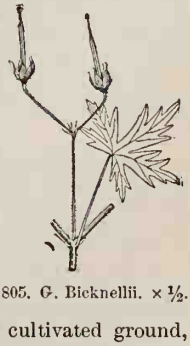
4. **G. Robertiànum** L. (Herb Robert.) Sparsely hairy, diffuse, strong-scented; *leaves* 3-*divided or pedately* 5-*divided*, the divisions twice pinnatifid; sepals awned; petals red-purple, long-clawed; carpels wrinkled; *seeds smooth.* — Moist woods and shaded ravines, e. Que. to Minn., s. to N. J., Pa., and Mo. June–Oct. (Eu.)

5. **G. pyrenàicum** Burm. f. Soft-pubescent and somewhat glandular, 2–6 dm. high; leaves orbicular, 5–7-cleft two thirds of the way to the base, the lobes obovate-oblong, again toothed; *sepals* puberulent, *merely pointed*, not awned; *petals* rose-colored, *deeply notched;* carpels puberulent; *seeds smooth.* — Roadsides and waste places, about Quebec; also at Bethlehem, Pa. (Adv. from Eu.)


804. G. carolinianum. × ½.

6. **G. caroliniànum** L. Diffusely branched, hairy; leaves about 5-parted, the divisions cut and cleft into many oblong-linear segments; *flowers glomerate-cymose;* sepals ovate, about as long as the *whitish or very pale pink petals;* beak of fruit tipped with a *short filiform style;* seeds ovoid, minutely reticulated. — Rocky places, etc., mostly in poor soil, e. Mass., southw. and westw., common; May–June. Fig. 804.

7. **G. Bicknéllii** Britton. Diffusely branched; leaves somewhat angular in contour, deeply cleft into narrow segments and lobes; *flowers in pairs*, the *peduncles scattered; petals rose-colored*, somewhat exceeding the sepals; *beak of fruit tipped with a prolonged filiform style* (4–6 mm. in length); seeds nearly black, finely reticulated. — Open woods, clearings, etc., Nfd. to B. C., s. to N. E., N. Y., Mich., Utah, etc. Fig. 805.


805. G. Bicknellii. × ½.

8. **G. rotundifòlium** L. Weak, diffusely branched, villous with gland-tipped hairs; *leaves orbicular* in outline, cleft half to two thirds the way to the base, the broadish segments crenate-toothed or lobed; petals rose-color, entire; *seeds finely reticulated.* — Waste places about New York City, Philadelphia, etc., rare. (Adv. from Eu.)

9. **G. pusíllum** Burm. f. Similar to the preceding in habit and foliage; flowers very small; petals purplish, about equaling or little exceeding the awnless sepals; *stamens* 5; fruit pubescent; *seed smooth.* — Waste places and cultivated ground, Mass., southw. and westw., casual. (Adv. from Eu.)

10. G. MÓLLE L. Weak, spreading, soft-pubescent; leaves orbicular, cleft to the middle, the segments crenate or incised; *sepals* ovate-oblong, *not awned*, villous; petals rose-colored, notched; *stamens* 10; *carpels transversely wrinkled, glabrous.* — Recently seeded lawns, etc., casual but not rare. (Adv. from Eu.)

11. G. COLUMBÌNUM L. (LONG-STALKED C.) Minutely hairy, with slender decumbent stems; *leaves* 5–7-parted, and *cut into narrow linear lobes; peduncles and pedicels filiform*, much elongated; *sepals awned*, about equaling the retuse purple petals; carpels subglabrous; seeds minutely reticulated. — Borders of fields, etc., N. J. and Pa. to Va.; also Dak. (Nat. from Eu.)

2. ERÒDIUM L'Hér. STORKSBILL

The 5 shorter stamens sterile or wanting. Styles in fruit twisting spirally, bearded inside. Otherwise as *Geranium*. (Name from ἐρωδιός, *a heron.*)

1. E. CICUTÀRIUM (L.) L'Hér. Annual, hairy; stems low, spreading; stipules acute; leaves pinnate, the leaflets sessile, 1–2-pinnatifid; *sepals bristle-tipped; filaments not toothed.* — About cities, not rare. (Adv. from Eu.)

2. E. MOSCHÀTUM (L.) L'Hér. Similar, but stouter; leaflets less divided; *sepals not bristle-tipped; antheriferous filaments 2-toothed.* — Waste ground, etc., eastw., infrequent. (Adv. from Eu.)

ZYGOPHYLLÀCEAE (CALTROP FAMILY)

Herbs (or southward woody plants), with opposite (or alternate) in our species abruptly pinnate undotted leaves, and perfect regular mostly 5-merous flowers. Stamens free, essentially hypogynous, in ours twice as many as the petals. Pistil of several united 1-few-ovuled carpels. Ovules anatropous with superior micropyle and large straightish embryo. — Chiefly tropical.

1. **Tribulus.** Carpels 5, several-ovuled, prickly.
2. **Kallstroemia.** Carpels 10, one-ovuled, tuberculate.

1. TRÍBULUS [Tourn.] L.

Sepals and petals (4–)5. Filaments slender, unappendaged; those before the petals sometimes slightly united with them, the alternate ones subtended by glands. Cells of ovary as many as the petals, 3–5-ovuled. — Ours spreading annuals. (The Latin name of the *caltrop*, which in form its prickly fruit suggests.)

1. T. TERRÉSTRIS L. (CALTROP.) Branched from the base; leaflets 5–7 pairs; flowers small, short-peduncled; petals pale yellow; mature carpels crested and armed with 2–4 spreading prickles. — Occasional in Atlantic States; also Ill., Neb., and Kan.; chiefly on dumps. (Adv. from Old World.)

2. KALLSTROEMIA Scop.

Sepals, petals, and stamens as in *Tribulus*. Cells of the ovary twice as many as the petals, each 1-ovuled, becoming 1-seeded nutlets, dorsally rounded, smooth or tuberculate but not prickly, at maturity falling away from the persistent stylar axis. — Diffuse annuals. (Name unexplained, given presumably in honor of some obscure botanist.)

1. K. MÁXIMA (L.) T. & G. Prostrate, grayish-hirsute; leaflets 4–6 pairs, oblong, obtuse, about 1 cm. long; flowers 9–15 cm. in diameter; petals yellow; fruit depressed-ovoid, beaked with a stoutish columnar style. — Railroad yards, etc., w. Mo. and e. Kan., where presumably adventive from the Southwest. (Trop. Am.)

RUTÀCEAE (Rue Family)

Plants with simple or compound leaves, dotted with pellucid glands and abounding with a pungent or bitter-aromatic acrid volatile oil, producing hypogynous almost always regular 3–5-merous flowers, the stamens as many or twice as many as the sepals (rarely more numerous); the 2–5 pistils separate or combined into a compound ovary of as many cells, raised on a prolongation of the receptacle (gynophore) or glandular disk. Embryo large, usually in fleshy albumen. Styles commonly united or cohering. Fruit usually capsular. Leaves in ours alternate. Stipules none. — A large family, chiefly of the Old World and the southern hemisphere.

1. **Zanthoxylum.** Flowers dioecious; ovaries 3–5, separate, forming fleshy pods.
2. **Ptelea.** Flowers polygamous; ovary 2-celled, forming a samara, like that of Elm.
3. **Ruta.** Flowers perfect; ovary 4–5-lobed, forming a several-seeded capsule.

1. ZANTHÓXYLUM L. Prickly Ash

Flowers dioecious. Sepals 4 or 5, obsolete in one species. Petals 4 or 5, imbricated in the bud. Stamens 4 or 5 in the sterile flowers, alternate with the petals. Pistils 2–5, separate, but their styles conniving or slightly united. Pods thick and fleshy, 2-valved, 1–2-seeded. Seed-coat crustaceous, black, smooth and shining. Embryo straight, with broad cotyledons. — Shrubs or trees, with mostly pinnate leaves, the stems and often the leafstalks prickly. Flowers small, greenish or whitish. (From ξανθός, *yellow*, and ξύλον, *wood*.)

1. **Z. americànum** Mill. (Northern P., Toothache-tree.) Leaves and flowers in *sessile axillary umbellate clusters; leaflets* 2–4 pairs and an odd one, ovate-oblong, *downy when young;* calyx none; petals 4–5; pistils 3–5, with slender styles; pods short-stalked. (*Xanthoxylum* of auth.). — Rocky woods and river-banks, w. Que. to Minn., s. to Va., Ky., Mo., and e. Kan. Apr, May. — An aromatic shrub, with yellowish-green flowers appearing before the leaves.

2. **Z. Clàva-Hérculis** L. (Southern P.) *Glabrous;* leaflets 3–8 pairs and an odd one, ovate or ovate-lanceolate, oblique, shining above; flowers in an ample *terminal cyme;* sepals and petals 5; pistils 2–3, with short styles; pods sessile. (*Z. carolinianum* Lam.) — Sandy coast of Va., and southw. June. — A small tree with very sharp prickles.

2. PTÈLEA L. Shrubby Trefoil. Hop Tree

Flowers polygamous. Sepals 3–5. Petals 3–5, imbricated in the bud. Stamens as many. Ovary 2-celled; style short; stigmas 2. Fruit a 2-celled and 2-seeded samara, winged all round, nearly orbicular. — Shrubs, with 3-foliolate leaves, and greenish-white small flowers in compound terminal cymes. (The Greek name of the Elm, here applied to a genus with similar fruit.)

1. **P. trifoliàta** L. Leaflets ovate, pointed, downy when young. — Rocky places, L. I. to Ont., Minn., and southw.; cultivated and often established elsewhere. June. — A tall shrub. Fruit bitter, used as a substitute for hops. Odor of the flowers disagreeable.

Var. **móllis** T. & G. Branchlets, petioles, and both surfaces of the somewhat thickish leaflets densely and permanently velvety. — Shore of L. Mich., Saugatuck, Mich. (*Wheeler*); also Tex., etc.

3. RÙTA [Tourn.] L. Rue

Flowers perfect, 4–5-merous. Calyx persistent. Petals yellow, the sides and apex strongly inrolled, the margin denticulate or ciliate-dentate. Stamens 8–10, inserted about the base of the torus, the alternate ones smaller. Capsule 4–5-lobed, dehiscent at the summit, many-seeded. — Heavy-scented herbs or

undershrubs with alternate simple or variously compound leaves. (The ancient name.)

1. R. GRAVÈOLENS L. (COMMON R.) Suffruticose, glaucous, 3–6 dm. high; leaves thickish, 2–3-pinnatifid, ultimate lobes or divisions obovate-cuneate; petals denticulate. — Formerly much cultivated for aromatic qualities and supposed medicinal value; now locally established in pastures, Weybridge, Vt. (*Brainerd*), Peaks of Otter, Va. (*Curtiss*), and very likely elsewhere. (Introd. from Eu.)

SIMARUBÀCEAE (QUASSIA FAMILY)

Trees and shrubs with floral structure much as in the Rutaceae *but the foliage destitute of pellucid dots.* — Chiefly tropical.

1. AILÂNTHUS Desf. TREE OF HEAVEN

Flowers polygamous. Calyx regular, 5-parted, the lobes imbricated. Petals 5, infolded-valvate. Stamens in staminate flowers 10, in perfect flowers 2–3, in pistillate flowers none. Disk lobed. Ovary 2–5-parted, becoming in fruit 1–5 narrowly oblong membranaceous samaras (1-seeded in the middle). — Handsome trees of rapid growth. Leaves odd-pinnate. Flowers small, green or yellowish, in ample terminal panicles, especially the staminate of unpleasant odor. (Name said to be from a vernacular Moluccan designation, meaning *tree of heaven*, in allusion to the height in the native habitat.)

1. A. GLANDULÒSA Desf. Leaves 3–6 dm. long, 11–23-foliolate; leaflets ovate, acuminate, entire or sparingly toothed toward the base. — Extensively cultivated as a shade tree, freely spreading by suckers, and locally self-sown (Introd. from Asia.)

POLYGALÀCEAE (MILKWORT FAMILY)

Plants with irregular hypogynous flowers, 4–8 diadelphous or monadelphous stamens, their 1-celled anthers opening at the top by a pore or chink; the fruit a 2-celled and 2-seeded pod.

1. POLÝGALA [Tourn.] L. MILKWORT

Flower very irregular. Calyx persistent, of 5 sepals, of which 3 (the uppermost and the 2 lowest) are small and often greenish, while the two lateral or inner (called *wings*) are much larger and colored like the petals. Petals 3, hypogynous, connected with each other and with the stamen-tube, the middle (lower) one keel-shaped and often crested on the back. Stamens 6 or 8; their filaments united below into a split sheath, or into 2 sets, cohering more or less with the petals, free above; anthers 1-celled. Ovary 2-celled, with an anatropous ovule pendulous in each cell; style prolonged and curved; stigma various. Fruit a small loculicidal 2-seeded pod, usually rounded and notched at the apex, much flattened contrary to the very narrow partition. Seeds carunculate. Embryo large, straight, with flat and broad cotyledons, in scanty albumen. — Bitter plants (low herbs in temperate regions), with simple entire often dotted leaves, and no stipules. (An old name composed of πολύς, *much*, and γάλα, *milk*, applied by Dioscorides to some low shrub reputed to increase lactation.)

* *Perennial or biennial; flowers purple or white; leaves alternate.*

+ *Flowers showy, commonly rose-purple, conspicuously crested; also some inconspicuous colorless cleistogamous flowers on subterranean branches.*

1. P. paucifòlia Willd. (FRINGED POLYGALA, FLOWERING WINTERGREEN.) Perennial; flowering stems short (7–10 cm. high); *lower leaves* small and *scale-like*, scattered, the *upper ovate, petioled, crowded* at the summit; *flowers* 1–3, *large*, peduncled; wings obovate, rather shorter than the fringe-crested keel; stamens 6; caruncle of 2 or 3 awl-shaped lobes longer than the seed. —

Woods, in light soil, e. Que. to Man., s. to Ga., Ill., and Minn. May, June. — A delicate plant, its handsome flowers 1.8 cm. long, rarely white.

2. **P. polýgama** Walt. Stems numerous from the biennial root, mostly simple, ascending, very leafy, 1.5–2.5 dm. high; *leaves oblanceolate or oblong;* terminal *raceme loosely many-flowered*, the broadly obovate wings longer than the keel; stamens 8; radical flowers racemed on short subterranean runners; lobes of the caruncle 2, scale-like, shorter than the seed. — Dry sandy soil, N. S., westw. and southw. July.

+ + Flowers white, in a solitary close spike; none cleistogamous.

3. **P. Sénega** L. (Seneca Snakeroot.) Stems several from thick and hard knotty rootstocks, simple, 1.5–3 dm. high; leaves lanceolate or oblong-lanceolate, with rough margins; wings round-obovate, concave; crest short; caruncle nearly as long as the seed. — Rocky soil, N. B. to Hudson Bay, Alberta, and southw. May–July.

Var. **latifòlia** T. & G. Taller, sometimes branched; leaves ovate or lanceolate, 5–10 cm. long, tapering to each end. — Md. to L. Huron, Dak., and Tenn.

** * Annuals, with all the leaves alternate; flowers in terminal spikes, heads, or racemes, chiefly purple or rose-color, in summer; none subterranean.*

+ Keel conspicuously crested; claws of the true petals united into a long and slender cleft tube much surpassing the wings.

4. **P. incarnàta** L. Glaucous; stem slender, sparingly branched; leaves minute and linear-awl-shaped; spike cylindrical; flowers flesh-color; caruncle longer than the narrow stalk of the hairy seed. — Dry soil, N. J. to s. Ont., Wisc., Neb., and southw., rather rare.

+ + Keel minutely or inconspicuously crested; the true petals not longer but mostly shorter than the wings; seed pear-shaped.

5. **P. sanguínea** L. Stem sparingly branched above, leafy to the top; *leaves oblong-linear; heads globular, at length oblong*, very dense (8–10 mm. thick), bright red-purple (rarely paler or even white); pedicels scarcely any; *wings broadly ovate, closely sessile*, longer than the pod; the 2-parted *caruncle almost equaling the seed.* (*P. viridescens* L.) — Sandy and moist ground; common, N. E., westw. and southw.

6. **P. mariàna** Mill. Stem slender, at length corymbosely branched; *leaves narrowly linear*, acute, 6–16 mm. long; *spikes short and dense* (6 mm. in diameter); the small rose-purple flowers on *pedicels of about the length of the pod;* wings obovate- or oval-oblong, narrowed at the base, scarcely exceeding the pod; *bracts deciduous* with the flowers or fruits; caruncle as long as and nearly enveloping the stalk-like base of the minutely hairy seed. (*P. fastigiata* Nutt.) — Pine barrens of N. J. to Ky., Fla., and Tex.

7. **P. Nuttállii** T. & G. Resembling the last, but usually lower; spikes cylindrical, slender; flowers duller or greenish-purple, on very *short pedicels;* the awl-shaped scaly *bracts persistent* on the axis after the flowers or fruits fall; seed very hairy, the caruncle smaller. — Dry sandy soil, coast of Mass. to Del., Md., and southw. — Spike sometimes rather loose.

8. **P. Curtíssii** Gray. Slender, 2.5 dm. high; leaves, etc., as in the two preceding; flowers rose-purple, in usually short racemes; pedicels about equaling or exceeding the persistent bracts; *the narrow oblong erect wings fully twice the length of the pod;* caruncle small, on one side of the stalk-like base of the very hairy *seed*, which is *conspicuously apiculate at the broader end.* — Md. to Ky., Ga., and Ala. — Founded upon an abnormal form with elongated racemes and pedicels.

** * * Annuals with at least the lower stem-leaves whorled in fours or fives; spikes terminating the stem and branches; flowering summer and autumn.*

+ Spikes short and thick (8–18 mm. in diameter); bracts persisting after the fall of the middle-sized rose- or greenish-purple flowers; crest small.

9. **P. cruciàta** L. Stems 1–2.5 dm. high, almost winged at the angles, with spreading opposite branches; leaves nearly all in fours, linear and some-

what spatulate or oblanceolate; *spikes sessile or nearly so; wings broadly deltoid-ovate, slightly heart-shaped, tapering to a bristly point* or rarely pointless; caruncle nearly as long as the seed. — Margins of swamps, and occasionally in drier places, s. Me. to S. C., mostly near the coast; and from Mich. to Minn. and Neb.

10. **P. brevifòlia** Nutt. Rather slender, branched above; leaves scattered on the branches, narrower; *spikes peduncled; wings lanceolate-ovate, pointless or barely mucronate.* — Margins of sandy bogs, R. I., N. J., and southw.

+ + *Spikes slender (about 4 mm. thick), the bracts falling with the flowers, which are small, greenish-white or barely tinged with purple, the crest of the keel larger.*

11. **P. verticillàta** L. Slender, 8–25 cm. high, much branched; stem-leaves all whorled, those of the mostly opposite branches scattered, linear, acute; spikes peduncled, usually short and dense, acute; wings round, clawed; the 2-lobed caruncle half the length of the seed. — Dry soil, N. E., westw. and southw.

Var. **ambígua** (Nutt.) Wood. Usually taller (2–3.5 dm. high); leaves (and branches) all scattered or the lowest in fours; spikes long-peduncled, more slender, the flowers often purplish and scattered. (*P. ambigua* Nutt.) — Me. to Mich., and southw.

* * * * *Biennials or annuals, with alternate leaves, and yellow flowers, which are disposed to turn greenish in drying; crest small; flowering all summer.*

12. **P. lùtea** L. Low; *flowers bright orange-yellow, in solitary ovoid or subcylindric heads* (1.8 cm. thick) terminating the stem or simple branches; leaves 2–5 cm. long, obovate or spatulate; lobes of the *caruncle nearly as long as the seed.* — Sandy swamps, L. I. to s. e. Pa., and southw. near the coast.

13. **P. ramòsa** Ell. *Flowers lemon-yellow, in numerous short and dense spike-like racemes* collected in a flat-topped *compound cyme;* leaves oblong-linear, the lowest spatulate or obovate; *seeds* ovoid, minutely hairy, *twice the length of the caruncle.* — Damp pine barrens, Del., and southw. June–Sept.

14. **P. cymòsa** Walt. Stem short, naked above, the numerous racemes in a usually almost *simple cyme;* leaves narrow, acuminate; *seeds* globose, *without caruncle.* — Del., and southw.; fl. midsummer.

EUPHORBIÀCEAE (Spurge Family)

Plants usually with a milky acrid juice, and monoecious or dioecious flowers, mostly apetalous, sometimes achlamydeous (occasionally polypetalous or gamopetalous); the ovary free and usually 3-celled, with one or sometimes two ovules hanging from the summit of each cell; stigmas or branches of the style as many or twice as many as the cells; fruit commonly a 3-lobed capsule, the lobes or carpels separating elastically from a persistent axis and elastically 2-valved; seed anatropous; embryo straight, almost as long as and the flat cotyledons mostly as wide as the fleshy or oily albumen. Stipules often present. — A vast family in the warmer parts of the world; most numerously represented in northern countries by the genus *Euphorbia*, which has very reduced flowers within a calyx-like involucre.

* Flowers with a calyx, without involucre.

+ Seeds and ovules 1 in each cell.

++ Flowers apetalous, in cymose panicles (2–3-chotomous); stamens 10, erect in the bud.

1. **Jatropha.** Calyx corolla-like, the staminate salver-form. Armed with stinging hairs.

++ ++ Flowers in terminal racemes or spikes; stamens inflexed in the bud; stellate-downy or scurfy or hairy and glandular; leaves mostly entire.

2. **Croton.** Flowers spiked or glomerate. Ovary and fruit 3 (rarely 2–4)-celled.

3. **Crotonopsis.** Flowers scattered on the branchlets. Ovary and fruit 1-celled.

++ ++ ++ Flowers in axillary spikes or racemes (except no. 7), apetalous (except no. 4); stamens 8 or more; anthers erect in the bud.

4. **Argythamnia.** Petals and sepals 5. Stamens 10–15, united. Styles bifid, linear.
5. **Mercurialis.** Sepals 3 or calyx 3-parted. Stamens 8–20; anther-cells attached at tip, pendulous. Styles (slightly united at the base) strongly papillose, undivided.
6. **Acalypha.** Calyx 4(3–5)-parted. Stamens mostly 8. Fertile flowers in the axils of leafy bracts. Stigmas finely dissected.
7. **Ricinus.** Racemes terminal, subpanicled. Calyx 3–5-parted. Stamens very numerous; the filaments repeatedly branched. Styles 2-parted.

++ ++ ++ ++ Flowers apetalous, in racemes or spikes pistillate at base; stamens 2 or 3; styles simple.

8. **Tragia.** Flowers racemose. Calyx-lobes valvate in bud. Hirsute or pubescent.
9. **Stillingia.** Flowers spicate. Calyx-lobes imbricate in bud. Fertile bracts glanduliferous. Glabrous.

← ← Seeds and ovules 2 in each cell; flowers monoecious.

10. **Phyllanthus.** Flowers axillary. Stamens 3, united.
11. **Andrachne.** Stamens 5 or 6. Flowers axillary, the staminate petaliferous.

* * Flowers all without calyx, included in a cup-shaped calyx-like involucre, — the whole liable to be mistaken for a single flower.

12. **Euphorbia.** Involucre surrounding many staminate flowers (each of a single naked stamen) and one pistillate flower (a 3-lobed pistil).

1. JÁTROPHA L.

Flowers monoecious, rarely dioecious, in a terminal open forking cyme; the fertile ones usually in the lower forks. Calyx corolla-like, in the staminate flowers often salver-shaped, 5-lobed; in the pistillate 5-parted, imbricated or convolute in the bud. Glands of the disk opposite the calyx-lobes. Stamens 10–30, monadelphous at base. Ovary mostly 3-celled; styles 3, united below their summits once or twice forked. Capsule separating into 3 two-valved carpels. Seed carunculate. — Perennial herbaceous or shrubby plants, chiefly tropical, with alternate mostly long-petioled palmately-veined leaves, and stipules. Our species has apetalous flowers, the staminate corolla salver-form, and is armed with stinging bristles. (Name said by Linnaeus, without entire clearness or classical accuracy, to be formed of *ἰατρὸν, a remedy*, and *φάγω, I eat.*)

1. J. stimulòsa Michx. (Tread-softly, Spurge Nettle.) Herbaceous, from a long perennial root, branching, 1.5–6 dm. high; leaves roundish-heart-shaped, 3–5-lobed nearly to the base, on long petioles; the divisions entire or acutely toothed, cut, or even pinnatifid, often discolored; flowers white, fragrant, 1.8 cm. long or more; filaments 10, monadelphous only at the woolly base, the outer set almost distinct. — Dry sandy soil, Va. to Fla. and La. June–Sept.

2. CRÒTON L.

Flowers monoecious, rarely dioecious, mostly in terminal spike-like racemes or spikes. *Ster. Fl.* Calyx 5(rarely 4–6)-parted; the divisions lightly imbricated or nearly valvate in the bud. Petals usually present, as many, but mostly small or rudimentary, hypogynous. Glands or lobes of the disk as many as and alternate with the petals. Receptacle usually hairy. Stamens 5 or more; filaments with the anthers inflexed in the bud. *Fert. Fl.* Calyx 5–10-cleft or -parted, nearly as in the staminate flowers; but petals none or minute rudiments. Ovary 3(rarely 2–4)-celled, with a single ovule in each cell; styles as many, from once to thrice 2-cleft. Capsule separating into as many 2-valved 1-seeded carpels. Seeds carunculate. — Stellate-downy, scurfy, or hairy and glandular plants, mostly strong-scented; the fertile flowers usually at the base of the sterile spike or cluster. Leaves alternate, or sometimes imperfectly opposite, with or without obvious stipules. (Κροτῶν, the Greek name of the Castor-oil Plant, of this family.)

Sterile flowers with 4-parted calyx, as many petals, a 4-rayed disk, and 8 stamens; fertile flowers with 5-parted calyx, very minute rudimentary petals, and the 3 styles 2-cleft.

1. **C. glandulòsus** L., var. **septentrionàlis** Muell. Arg. Annual, rough hairy and glandular, 3–6 dm. high, somewhat umbellately branched; leaves oblong or linear-oblong, obtusely toothed, the base with a saucer-shaped gland on each side; fertile flowers captitate-clustered at the base of the sterile spike, sessile in the forks and terminal. — Open waste places and sandy barrens, Va. to Fla., and Tex.; northw. in Miss. basin to Kan., Ia., Ill., and Ind.; rarely on ballast northeastw.

* * *Sterile flowers with 5-parted calyx, as many glands alternating with the petals, and 10–14 stamens; fertile flowers with 7–12-parted calyx, no petals, and the 3 styles twice or thrice 2-parted.*

2. **C. capitàtus** Michx. Annual, densely soft-woolly and somewhat glandular, 2–6 or more dm. high, branched; leaves long-petioled, lance-oblong or elongated-oblong, rounded at base, entire; petals obovate-lanceolate, densely fimbriate; fertile flowers several, capitate-crowded at the base of the short terminal sterile spike. — Barrens, N. J. to Fla. and Tex.; northw. in Miss. basin to Ind., Ill., Mo., and Kan. July–Sept.

* * * *Sterile flowers with unequally 3–5-parted calyx, as many petals and scale-like glands, and 3–8 stamens; fertile flowers with equally 5-parted calyx, no petals, 5 glands, and 2 sessile 2-parted stigmas.*

3. **C. monanthógynus** Michx. Annual, whitish-stellate-pubescent and rusty-glandular; stems 1.4–6 dm. high, slender, erect, below often umbellately 3–4-forked, then repeatedly 2–3-forked or alternately branched; leaves oblong-ovate or narrowly oblong, entire, often acutish, 1.5–3 dm. long, about twice the length of the petioles; flowers in the forks, the sterile few on the summit of a short and erect peduncle, the fertile few and clustered or mostly solitary on short recurved peduncles; ovary 2-celled; fruit often by abortion 1-celled and 1-seeded; the seed broadly oval. — Barren and dry prairies, s. Ind. to N. C. and Fla., w. to Ia., e. Kan., and Tex.; occasionally adv. northeastw. June–Sept.

* * * * *Dioecious; calyx equally 5-parted; petals none; stamens 10 or more; styles twice or thrice dichotomously 2-parted.*

4. **C. texénsis** (Klotzsch) Muell. Arg. Annual, covered with a close canescent stellate pubescence, dichotomously branched or spreading, 3–6 dm. high; leaves narrowly oblong-lanceolate to linear; staminate spikes or racemes very short, often sessile; capsule stellate-tomentose and somewhat muricate. — Sandy soil, Del. (*Commons*); and from Ala. to Wyo., Col., Ariz., and Mex.; rarely on ballast northw.

3. CROTONÓPSIS Michx.

Flowers monoecious, in very small terminal or lateral spikes or clusters, the lower fertile. *Ster. Fl.* Calyx equally 5-parted. Petals 5, spatulate. Stamens 5, opposite the petals; filaments distinct, inflexed in the bud, enlarged at the apex. *Fert. Fl.* Calyx unequally 3–5-parted. Petals none. Glands (petal-like scales) 5, opposite the sepals. Ovary 1-celled, simple, 1-ovuled, bearing a twice or thrice forked style. Fruit dry and indehiscent, 1-seeded. Seed without caruncle. — A slender low annual, with short-petioled linear or elliptical-lanceolate leaves, which are green and smoothish above, but silvery-hoary with stellate hairs and scurfy with brownish scales underneath. (*Croton* and ὄψις, *appearance*, from likeness to *Croton*.)

1. **C. lineàris** Michx. Fruit about 2 mm. long. — Dry sandy soil, s. Ct. (*Eames*) to Pa., southw. near the coast to Fla. and Tex.; inland in Miss. basin to Ill., Mo., and Kan. July–Sept

4. ARGYTHÁMNIA P. Br.

Flowers monoecious. Calyx 5-parted, valvate in the staminate flowers, imbricate in the pistillate. Petals alternate with the calyx-lobes and with the prominent lobes of the glandular disk. Stamens 5–15, united into a central column in 1-3 whorls. Styles 1-3-cleft. Capsule depressed, 3-lobed. Seeds subglobose, roughened or reticulated, not carunculate. — Erect herbs or undershrubs, with purplish juice, and alternate usually stipulate leaves. (Name from *ἄργυρος*, *silver*, and *θάμνος*, *bush*, from the hoariness of the original species.)

1. **A. mercurialìna** Muell. Arg. Stem erect, nearly simple, 3–6 dm. high, sericeous; leaves sessile, oblong-ovate to lanceolate, entire, pubescent with appressed hairs or glabrate, somewhat rigid; raceme many-flowered, exceeding the leaves; spatulate petals of the sterile flowers as long as the calyx-lobes; ovary sericeous; capsule appressed-pubescent, 8–10 mm. in diameter. (*Ditaxis* Coult.) — Kan. to Ark. and Tex.

5. MERCURIÀLIS [Tourn.] L. Mercury

Dioecious or monoecious. Flowers apetalous, in interrupted axillary spikes. Stamens 8–20, distinct. Calyx small, green, globose in bud, 3-parted. Carpels 2(–3). — Herbs, with opposite pinnately veined leaves. (A plant-name used by Pliny and meaning *belonging to the god Mercury.*)

1. **M. ánnua** L. Weak erect leafy-stemmed annual; leaves lanceolate or ovate-lanceolate, crenate-serrate; carpels hispid. — Waste places and ballast ground, N. S. to S. C. and O. (Adv. from Eu.)

6. ACALÝPHA L. Three-seeded Mercury

Flowers monoecious; the sterile very small, clustered in spikes; the few or solitary fertile flowers at the base of the same spikes, or sometimes in separate ones. Calyx of the sterile flowers 4-parted and valvate in bud; of the fertile, 3–5-parted. Corolla none. Stamens 8–16; filament short, monadelphous at base; anther-cells separate, long, often worm-shaped, hanging from the apex of the filament. Styles 3, the upper face or stigmas cut-fringed (usually red). Capsule separating into 3 globular 2-valved carpels, rarely of only one carpel. — Herbs (ours annuals), or in the tropics often shrubs, resembling Nettles or Amaranths; the leaves alternate, petioled, with stipules. Clusters of sterile flowers with a minute bract; the fertile surrounded by a large and leaf-like cut-lobed persistent bract. (Ἀκαλήφη, an ancient name of the Nettle.)

* *Fruit smooth or merely pubescent; seeds nearly smooth.*

1. **A. virgínica** L. Smoothish or hairy, 3–6 dm. high, often turning purple; *leaves ovate or oblong-ovate*, obtusely and sparsely serrate, long-petioled; *sterile spike* rather few-flowered, mostly *shorter than* the large *leaf-like* palmately 5–9-cleft fruiting *bracts;* fertile flowers 1–3 in each axil. — Fields and open places, N. S. to Ont. and Minn., s. to the Gulf. July–Sept.

2. **A. grácilens** Gray. Finely pubescent and often villous; *leaves lanceolate or even linear*, less toothed and shorter-petioled; the slender *sterile spike* often 2 cm. long, and much *surpassing* the less cleft or few-toothed fruiting *bracts.* (*A. virginica*, var. Muell. Arg.) — Sandy or dry soil, s. N. H. to Fla., w. to e. Kan. and Tex. — Carpels by abortion sometimes reduced to one (*A. monococca* Engelm.).

* * *Fruit echinate with soft bristly green projections; seeds rough-wrinkled.*

3. **A. ostryaefòlia** Riddell. Leaves thin, ovate-cordate, sharply and closely serrate-toothed, abruptly acuminate, long-petioled; sterile spikes short, axillary; the fertile ones mostly terminal and elongated, their bracts deeply cut into many linear lobes. (*A. caroliniana* Ell., not Walt.) — N. J. to Fla., w. to O., Kan., and Tex.

7. RÍCINUS [Tourn.] L. Castor-oil Plant

Flowers in racemose or panicled clusters, the fertile above, the staminate below. Calyx 5-parted. Stamens very numerous, with repeatedly branching filaments. Styles 3, united at base, each bifid, red. Capsule large, 3-lobed, with 3 large seeds. — A tall stately annual, with very large alternate peltate and palmately 7–11-cleft leaves often 3–6 dm. broad. (Ancient Roman name.)

1. **R.** communis L. — Cultivated for ornament, and sometimes spreading to waste ground. (Introd. from the tropics.)

8. TRÀGIA [Plumier] L.

Flowers monoecious, in racemes, apetalous. *Ster. Fl.* Calyx 3–5(chiefly 3)-parted, valvate in the bud. Stamens 2 or 3; filaments short; anther-cells united. *Fert. Fl.* Calyx 3–8-parted, persistent. Style 3-cleft or 3-parted; the branches 3, simple. Capsule 3-celled, 3-lobed, bristly, separating into three 2-valved 1-seeded carpels. Seeds not carunculate. — Erect or climbing plants (ours perennial herbs), pubescent or hispid, sometimes stinging, with mostly alternate stipulate leaves; the small-flowered racemes terminal or opposite the leaves; the sterile flowers above, the few fertile at the base, all with small bracts. (Named for the early herbalist *Bock*, latinized *Tragus*.)

1. **T. ùrens** L. *Erect*, paniculate-branched, *softly hairy*, 1.5–3 dm. high; *leaves* varying from obovate-oblong to narrowly linear, *acute at base*, obtusely or sinuately few-toothed or lobed, sometimes entire, *short-petioled or sessile*, paler beneath; sterile calyx usually 4-parted; stamens 2. (*T. innocua* Walt.) — Dry sandy soil, e. Va. to Fla. and La. May–Aug. — Not stinging.

2. **T. nepetaefòlia** Cav. *Erect or reclining* or slightly twining, hirsute with stinging hairs; *leaves ovate-lanceolate or triangular-lanceolate*, or the lower ovate, *all somewhat cordate or truncate at base*, coarsely cut-toothed, *short-petioled;* sterile calyx usually 3-parted and stamens 3. (*T. urticaefolia* Michx.) — Va. (*Pursh*), and common southw. to Fla. and Tex.; Mo., Kan., and westw. T. ramòsa Torr. (*T. stylaris* Muell. Arg.), with 4–6-parted sterile calyx, 4–6 stamens, and elongated styles, is probably only a variety. — Mo. to Kan. and southwestw.

3. **T. macrocárpa** Willd. *Twining*, somewhat hirsute; *leaves deeply cordate*, ovate, mostly narrowly acuminate, sharply serrate, 6–11 cm. long, all but the uppermost *long-petioled;* pod 1.3 cm. broad. (*T. cordata* Michx.) — Ky. and Mo. to Ga., Fla., and Tex.

9. STILLÍNGIA Garden.

Flowers monoecious, aggregated in a terminal spike. Petals and glands of the disk none. Calyx 2–3-cleft or -parted; the divisions imbricated in the bud. Stamens 2 or 3; anthers adnate, turned outward. Style thick; stigmas 3, diverging, simple. Capsule 3-celled, 3-lobed, 3-seeded. Seed carunculate. — Smooth upright plants, with the alternate leaves mostly 2-glandular at base; the fertile flowers few at the base of the dense sterile spike (rarely separated); the bract for each cluster with a large gland on each side. (Named for *Dr. B. Stillingfleet*, English naturalist of the 18th century.)

1. **S. sylvática** L. Herbaceous, 3–9 dm. high; leaves almost sessile, oblong-lanceolate, serrulate; glands of the spike saucer-shaped. — Sandy and dry soil, Va. to Fla., w. to Kan. and Tex. May–Oct. — Sometimes called Queen's-root or Queen's-delight.

10. PHYLLÁNTHUS L.

Flowers monoecious, axillary. Calyx usually 5–6-parted, imbricated in the bud. Petals none. Stamens mostly 3, erect in the bud, often united. Ovules 2 in each cell of the ovary. Capsule depressed; each carpel 2-valved, 2-seeded. Seeds not carunculate. — Leaves alternate, 2-ranked, with small stipules. (Name

composed of φύλλον, *leaf*, and ἄνθος, *blossom*, because the flowers in a few species are borne upon leaf-like dilated branches.)

1. **P. caroliniénsis** Walt. Annual, low and slender, branched; leaves obovate or oval, short-petioled; flowers commonly 2 in each axil, almost sessile, one staminate, the other fertile; calyx 6-parted; stamens 3; styles 3, each 2-cleft; glands of the disk in the fertile flowers united into a cup. — Gravelly banks, e. Pa. to centr. Ill., s. e. Mo., and southw.

11. ANDRÁCHNE L.

Flowers monoecious, pedicellate, the sterile petaliferous, fasciculate, the fertile often petaliferous, usually solitary in the axils. Stamens and calyx-segments 5–6. Pod dry, splitting into three 2-valved carpels. — Shrubs and undershrubs, with many ascending leafy branches. Leaves oval or obovate, entire. (From ἀνδράχνη, classic Greek for the purslane.)

1. **A. phyllanthoìdes** (Nutt.) Muell. Arg. Nearly glabrous shrub; stems and ascending simple branches lithe; leaves broadly obovate, membranaceous, 1.5 cm. long, shortly petiolate; pedicels capillary, 7–14 cm. long; petals in the sterile flowers about as long as the obovate calyx-segments, in the fertile obsolescent. — Rocky and gravelly places, s. Mo. to Tex.

12. EUPHÓRBIA L. Spurge

Flowers monoecious, included in a cup-shaped 4–5-lobed involucre (*flower* of older authors) resembling a calyx or corolla, and usually bearing large thick glands (with or without petal-like margins) at its sinuses. Sterile flowers numerous and lining the base of the involucre, each from the axil of a little bract, and consisting merely of a single stamen jointed on a pedicel like the filament; anther-cells globular, separate. Fertile flower solitary in the middle of the involucre, soon protruded on a long pedicel, consisting of a 3-lobed and 3-celled ovary with no calyx (or a mere vestige). Styles 3, each 2-cleft; the stigmas therefore 6. Pod separating into three 1-seeded carpels, which split elastically into 2 valves. Seed often caruncled (ours only in §§ 5 and 6). — Plants (ours essentially herbaceous) with a milky acrid juice. Peduncles terminal, often umbellate-clustered; in the first section mostly appearing lateral, but not really axillary. (Named for *Euphorbus*, physician to King Juba.)

A. *Glands of the involucre with petal-like usually white or rose-colored margins or appendages; these almost obsolete in no.* 1.

§ 1. ANISOPHÝLLUM Röper. *Leaves all opposite, short-petioled, small, oblique at base; stipules awl-shaped or scaly and often fringed, persistent; stems much branched, spreading or usually procumbent; involucres solitary in the forks or in terminal or pseudo-lateral clusters, small, with 4 glands; annuals.*

* *Seeds smooth and even; leaves entire; whole plant glabrous.*

+ *Leaves oblong to linear,* 6–20 *mm. long; pod* 2–3 *mm. in length.*

++ *Appendages of the involucral glands minute or none.*

1. **E. polygonifòlia** L. (Seaside S.) Prostrate-spreading; *leaves oblong-linear*, obtuse, mucronate, slightly cordate or obtuse at base, 8–16 mm. long; stipules setaceously divided; peduncles in the forks, as long as the petioles; lobes of the involucre longer than the *minute not appendaged glands;* pods obtusely angled; seeds ovate, over 2 mm. long, the largest of this section. — Sandy shores of the Atlantic (from N. S southw.) and of the Great Lakes; also reported from centr. Ia. and westw.

2. **E. Geyèri** Engelm. Procumbent; *leaves oblong-ovate*, obtuse, slightly mucronate, mostly acutish at base, lowermost cordate, 6–12 mm. long; stipules setaceously divided; peduncles as long as the petioles, at length in loose foliaceous lateral clusters; glands with *narrow white or red appendages;* pods

acutely angled; seeds ovate, acute at one end, 1 mm. long. — Sandy soil, Ill. to Wisc., Minn., and Kan. June–Sept.

↔ ↔ Appendages of the involucral glands broad and conspicuous, white and petaloid.

3. **E. petaloídea** Engelm. Half-erect and spreading; *leaves narrowly oblong, retuse or emarginate;* peduncles 2 mm. in length, longer than the petioles; pod obtusely angled; seeds nearly 2 mm. long. — Ia. and Mo., westw. and southwestw. June–Sept.

4. **E. zygophylloìdes** Boiss. Habit of the preceding but taller and more slender; *leaves linear; peduncles capillary, 5 mm. long;* capsule deeply 3-sulcate, the lobes carinate; seeds obscurely 4-angled. (*E. Nuttallii* Small.) — Limestone barrens, Greene Co., Mo. (*Blankinship*) to Kan., and southwestw.

← ← Leaves suborbicular, 1–3 mm. long; pod 1–1.5 mm. long.

5. **E. sérpens** HBK. Stems filiform, prostrate, and often rooting; *leaves round-ovate,* obtuse or cordate at base, only 1–3 mm. long; *stipules membranaceous, triangular;* peduncles much longer than the petioles, at length in loose foliaceous lateral clusters; glands of the very small involucre with *minute crenulate appendages;* pods acutely angled; seeds obtusely angled, 1 mm. long or less. — Rich soil, s. w. Ont., Ill., and Ia. to Kan., and southw.; rarely adv. eastw.

** * Seeds minutely roughened or transversely wrinkled; leaves more or less serrulate.*

← Glabrous or nearly so.

↔ Seeds acutely angled; leaves 4–12 mm. long.

6. **E. serpyliifòlia** Pers. Glabrous, prostrate-spreading; *leaves obovate-oblong,* narrowed at the very oblique base, sharply serrulate toward the obtuse apex, 6–12 mm. long, often with a red spot; stipules lanceolate, fimbriate; peduncles as long as or longer than the petioles, at length in loose foliaceous lateral clusters; glands of the small involucre with narrow somewhat toothed appendages; pods sharply angled; *seeds acutely quadrangular, slightly cross-wrinkled,* often pitted, nearly 1.5 mm. long. — Sandy and alluvial soil, u. Mich. (*Farwell*) to Mo., Tex., and westw.

7. **E. glyptospérma** Engelm. Glabrous (or very rarely puberulent), erect-spreading; *leaves linear-oblong,* mostly falcate, very unequal at base, slightly serrulate toward the obtuse apex, 4–10 mm. long; stipules lanceolate, setaceonsly divided; peduncles as long as the petioles, in dense foliaceous lateral clusters; glands of the very small involucre with narrow crenulate appendages; pods sharply angled; *seeds sharply 4-angled and with 5 or 6 sharp transverse wrinkles,* 1 mm. long. — Oxford Co., Me. (*Parlin, Miss Furbish*); Fisher's I., N. Y.; Ont. to Wisc., Mo., and westw.

↔ ↔ Seeds obtusely angled; leaves 1–3 cm. long.

8. **E. Préslii** Guss. Stem often subsimple below, erect or obliquely ascending, 2–10 dm. high; leaves oblique at the obtuse or slightly cordate base, ovate-oblong or oblong-linear, sometimes falcate, serrate, 1–3 cm. long, usually with a red spot or red margins; stipules triangular; peduncles longer than the petioles, collected in loose leafy terminal cymes; *appendages entire,* larger and white, or smaller and sometimes red; *pod glabrous; seeds ovate, obtusely angled, wrinkled and tubercled,* 1 mm. long, blackish. (*E. hypericifolia* Man. ed. 5, not L.? *E. nutans* Lag.) — Dry open soil, Mass. to Ont., Wisc., Neb., and southw.

← ← Puberulent to hirsute.

9. **E. hirsùta** (Torr.) Wiegand. Of lower stature and more procumbent than the preceding; stems hirsute, copiously branched from near the base; leaves smaller, 8–14 mm. long, oblong to ovate; *seeds black with pale semi-transparent envelope, sharply 4-angled,* the flattish or concave sides obscurely wrinkled. (*E. hypericifolia,* var. Torr.) — Dry sandy soil, e. Que. to w. Ont., s. to N. J., Pa., O., and Ill., common.

10. **E. maculàta** L. (Milk Purslane.) Prostrate; stems puberulent or hairy; *leaves oblong-linear*, very oblique at base, serrulate upward, more or less pubescent or sometimes smoothish, 8–12 mm. long, usually with a brown-red spot in the center; stipules lanceolate, fimbriate; peduncles as long as the petioles, in dense foliaceous lateral clusters; glands of the small involucre minute, with narrow slightly crenate usually red appendages; pods acutely angled, puberulent; *seeds* 0.4 mm. long, *red, with pale envelope, sharply 4-angled and with about 4 shallow grooves across the concave sides.* — Open places, roadsides, etc., common.

11. **E. humistràta** Engelm. Procumbent, puberulent or hairy; *leaves elliptical or obovate*, very oblique at base, serrulate toward the apex, sparsely hairy underneath, 8–18 mm. long, sometimes with a brown spot above; stipules lanceolate, fimbriate; peduncles rather shorter than the petioles, in dense scarcely foliaceous lateral clusters; *involucre cleft on the back*, its red or white appendages truncate or crenate; pods sharply angled, puberulent; *seeds ovate, red, with pale envelope, obtusely angled, minutely roughened*, 1 mm. long. — Rich soil, Ont. to Minn., and southw.

12. **E. stictóspora** Engelm. Similar in habit and pubescence; leaves mostly shorter, oval or suborbicular, not spotted; *seeds at maturity reddish-gray, finely and distinctly pitted.* — Kan., westw. and southwestw.

§ 2. ZYGOPHYLLÍDIUM Boiss. *Leaves opposite, on short petioles, not oblique, with stipular glands; stems dichotomously branched, erect; cymes terminal; involucres with 5 glands; seeds tuberculate.*

13. **E. hexágona** Nutt. Somewhat hairy, 3–15 dm. high; branches striate-angled; leaves linear-lanceolate, entire; involucre hairy without and within; glands with green ovate-triangular appendages twice their length; capsule smooth; seeds ovate. — Ia. to Tex., w. to Col. and Mont.; also on waste ground, Wilmington, Del. (*Commons*).

§ 3. PETALÒMA Boiss. *Uppermost leaves with conspicuous white petal-like margins, whorled or opposite, the others scattered; erect annuals, with leaves equal at base and entire, and with lanceolate deciduous stipules; involucres 5-lobed, in an umbel-like inflorescence.*

14. **E. marginàta** Pursh. (Snow-on-the-Mountain.) Stem stout, 3–9 dm. high, erect, hairy; leaves sessile, ovate or oblong, acute; umbel with three dichotomous rays; glands of the involucre with broad white appendages. — Minn. to Mo., Col., Tex., and S. C.; spreading eastw. to O., and frequently escaping from flower-gardens.

§ 4. TITHYMALÓPSIS (Klotzsch & Garcke) Boiss. *Only the uppermost leaves whorled or opposite; erect perennials, with entire leaves equal at base; stipules none; involucres mostly 5-lobed, in the forks of the branches and terminal; inflorescence umbelliform.*

15. **E. corollàta** L. (Flowering S.) Glabrous or sometimes sparingly hairy, 4–10 dm. high; *root deep; stem* usually *simple for more than half its length;* leaves ovate, lanceolate, or linear, entire, obtuse; umbel 5(3–7)-forked, and the forks again 2–3(or rarely 5)-forked; involucres long-peduncled, with showy white appendages (appearing like petals), the lobes minute and incurved; pod slender-pediceled, smooth; seeds thick, 2 mm. long or more, ash-colored, slightly uneven. — Rich or sandy soil, N. Y. to Fla., w. to Minn. and La.; also locally naturalized in N. E. July–Oct.

16. **E. marilándica** Greene. Pale green; *root or rootstock horizontal, near the surface; stem* 3 dm. high, *trichotomous from near the base;* leaves lance-linear, whorled below, the upper opposite, and floral reduced to subulate bracts. — Sand hills, Anne Arundel Co., Md. (*Greene*). — Not seen; description compiled.

AA. *Glands of the involucre without petaloid appendages.*

§ 5. POINSÉTTIA (Graham) Baill. *Involucres in terminal clusters, 4–5-lobed, with few (or often solitary) cup-shaped glands; erect annuals, with entire, dentate, or sinuate leaves, all or only the upper ones opposite, the uppermost often colored, especially at base; stipules reduced to small glands.*

17. E. dentàta Michx. Erect or ascending, hairy, 2.5–12 dm. high; leaves ovate, lanceolate, or linear, petioled, coarsely toothed, 4–8 cm. long, *only the lowest alternate*, the upper often paler at base; involucres almost sessile, with 5 oblong dentate lobes, and one or sometimes more *short-stalked glands;* seeds ovoid-globular, slightly tubercled. — Rich soil, Pa. to Wyo. and Tex. July–Sept.

18. E. heterophýlla L. (Painted Leaf.) Erect, 3–9 dm. high, glabrous; *leaves alternate*, petioled, ovate-fiddle-shaped and sinuate-toothed, or lanceolate or linear and entire, often only those of the branches linear; the upper usually with a red base; involucres about the length of the peduncle, with 5 ovate incised lobes and one or few *almost sessile glands;* seeds nearly globular, tubercled. — Slopes and rocky soil, Minn. to w. Ill., Kan., Tex., and Fla.

§ 6. TITHÝMALUS [Tourn.] Pers. *Involucres in a terminal dichotomous or commonly umbelliform inflorescence, 5- or usually 4-lobed, with as many flat or convex entire or crescent-shaped glands; seeds carunculate (except* in no. 19); *ours ascending or erect, and mostly glabrous, without stipules.*

* *Perennials with entire leaves, all or only the upper opposite; involucres long-peduncled in a dichotomous inflorescence, mostly with 5 transversely oblong glands; seeds without caruncle.*

19. E. Ipecacuánhae L. Stems many from a very long perpendicular root, erect or diffusely spreading, 1–2.5 dm. long, forking from near the base; leaves varying from obovate or oblong to narrowly linear, almost sessile, glabrous; peduncles elongated (1.3–2.5 cm. long); pod long-pediceled, obtusely angled, nearly smooth; seed ovoid, white, sparsely marked with impressed dots. — Sandy soil, near the coast, Ct. to Fla.; also barrens of s. Ind.

* * *Leaves scattered, only the floral in the umbelliform inflorescence whorled or opposite and of a different shape; glands mostly 4.*

+ *Leaves serrulate or rarely entire; glands transversely oval, obtuse.*

++ *Seeds smooth and even; pod warty or rough.*

20. E. Darlingtònii Gray. Tall *perennial*, 6–12 dm. high; *leaves entire, minutely downy beneath;* those of the stem lanceolate-oblong from a narrow base; the floral oval, very obtuse; the upper roundish-dilated with a truncate base; umbel 5–8-rayed, then simply forked; *pod minutely warty;* large globular seed with a small caruncle. — Copses, Pa. to the mts. of N. C. July–Sept.

21. E. obtusàta Pursh. Erect *annual*, 3–6 dm. high; *leaves oblong-spatulate*, minutely serrulate, *smooth, all obtuse;* upper ones cordate at base; floral ones ovate, dilated, barely mucronate; umbel once or twice divided into 3 rays, then into 2; *involucre with naked lobes* and small stipitate glands; *styles distinct*, longer than the ovary, erect, 2-*cleft to the middle;* pod beset with long warts. — Damp woods, Pa. to S. C., w. to Ia., Kan., and (?) Tex.

22. E. platyphýlla L. Erect *annual*, 2–4.5 dm. high; upper *stem-leaves lanceolate-oblong, acute*, cordate at base, minutely serrulate, mostly *with scattered hairs beneath;* floral ones triangular-ovate, subcordate; umbel 5-rayed; *involucre with ciliate lobes* and large sessile glands; *styles* longer than the ovary, *united at base, slightly* 2-*cleft;* pod covered with depressed warts. — L. Champlain to w. Pa. and Man. June–Aug. (Nat. from Eu.)

++ ++ *Seeds rugose or reticulated; leaves serrulate; annuals.*

23. E. dictyospérma Fisch. & Mey. Stem erect, 2–4.5 dm. high; *leaves* oblong- or obovate-spatulate, smooth, all obtuse and *obtusely serrate;* upper ones cordate at base; floral ones roundish-ovate or obscurely heart-shaped, slightly mucronate; umbels once or twice 3-forked, then 2-forked; involucre

with nearly naked lobes and *small almost sessile glands;* styles shorter than the ovary, spreading or recurved; *pod warty; seeds delicately reticulated* (*E. arkansana* and var. *missouriensis* Norton.) — Prairies and roadsides, Mo to Ala., and westw. May–July.

24. **E.** Helioscòpia L. (Wartweed.) Stems ascending, 1.5–3.5 dm. high, stout; *leaves all obovate* and very rounded or retuse at the end, *finely serrate*, smooth or a little hairy, those of the stem wedge-shaped; umbel divided into 5 rays, then into 3, or at length simply forked; *glands orbicular, stalked; pods smooth and even; seeds with coarse honeycomb-like reticulations.* — Waste places, and dry open soil, e. Que. to Ont., abundant; locally s. to Pa., O., and Ill. (Nat. from Eu.)

+ + Leaves entire; glands crescent-shaped or 2-horned.

++ Seeds smooth and dark-colored; perennials, with running rootstocks.

25. **E.** Ésula L. Stems clustered, 3–4 dm. high; *leaves lanceolate to linear, the floral* (yellowish) *broadly heart-shaped*, mucronate, umbel divided into many rays, then forking; *glands short-horned* (brown); pods smoothish and granular. — Sandy banks, s. Me. (*Parlin*) to N. J., Pa., and Mich. (Nat. from Eu.)

26. **E.** Cyparíssias L. (Cypress S.) Stems densely clustered, 1.2–3 dm. high; *stem-leaves linear, crowded, the floral heart-shaped;* umbel many-rayed; *glands crescent-shaped;* pods granular. — Escaped from gardens, common. (Introd. from Eu.)

27. **E.** lùcida Waldst. & Kit. *Stout and tall* glabrous perennial; *leaves oblong or oblong-lanceolate*, the floral broadly heart-shaped, mucronate; terminal umbel many-rayed, the rays forking; glands short-horned; *pods finely wrinkled.* (*E. nicaeensis* Man. ed. 6, not All.) — Field and roadsides, Susquehanna Valley, N. Y. and Pa. (Nat. from Eu.)

++ ++ Seeds sculptured, ash-colored; pod smooth; annuals or biennials.

28. **E.** Pèplus L. (Petty S.) Erect or ascending, 1.5–3 dm. high; leaves round-obovate, the upper floral ones ovate; umbel 3-rayed, then forking; glands long-horned; lobes of the *pod 2-wing-crested* on the back; *seeds 2-grooved on the inner face, pitted on the back*, scarcely over 1 mm. long. — Waste places and cultivated ground, N. B. to N. J., Pa., and Ia. (Adv. from Eu.)

29. **E.** commutàta Engelm. Stems branched from a commonly decumbent base, 1.5–3 dm. high; *leaves* obovate, obtuse, the upper all *sessile*, the upper floral ones roundish-dilated, broader than long; umbel 3-forked; glands with slender horns; *capsule obtusely angled; seeds ovoid, pitted all over*, 2 mm. long. — Along streams and shady slopes, Pa. to Fla., Mo., and Minn.

** * * Glabrous annual or biennial with entire opposite and decussate leaves, an umbelliform inflorescence, and short-horned glands.*

30. **E.** Láthyrus L. (Caper S., Mole Plant.) Stem stout, 3–9 dm. high; leaves thick, linear or oblong, the floral oblong-ovate and heart-shaped; umbel 4-rayed, then forking. — Sparingly escaped from gardens, Ct. and N. Y. to N. C. (Introd. from Eu.)

CALLITRICHÀCEAE (Water Starwort Family)

Low slender and usually tufted chiefly aquatic herbs (glabrous or beset with microscopic stellate scales), with entire spatulate or linear leaves, monoecious flowers (solitary or 2 or 3 together in the axil of the same leaf) wholly naked or inclosed by a pair of membranaceous bracts. Sterile flower a single stamen, the filament bearing a heart-shaped 4-celled anther, which by confluence becomes 1-celled, and opens by a single slit. Fertile flower a single 4-celled ovary, bearing 2 distinct filiform stigmas. Fruit nut-like, compressed, 4-lobed, 4-celled, separating at maturity into as many closed 1-seeded portions. Seeds pendulous; embryo slender, straight or slightly curved, nearly the length of the oily albumen.

1. CALLÍTRICHE L. Water Starwort

The only genus. (Name from καλός, *beautiful*, and θρίξ, *hair*, from the slender stems.)

* *Small annuals, forming tufts on moist soil, destitute of stellate scales; leaves uniform, very small, obovate or oblanceolate, 3-nerved, crowded; bracts none.*

1. C. defléxa A. Br., var. Austìni (Engelm.) Hegelm. Stems 1–2.5 cm. high; fruit 0.7 mm. wide, broader than high, deeply notched above and below, on a pedicel often nearly of its own length or almost sessile; lobes of the fruit narrowly winged and with a deep groove between them; persistent stigmas shorter than the fruit, spreading or reflexed; leaves 2–4 mm. long. (*C. Austini* Engelm.) — Damp soil, Ct. to Del.; also from Tenn. to Mo. and Tex. (Mex., S. A.)

* * *Amphibious perennials; leaves with stellate scales, the floating ones obovate and 3-nerved, the submersed linear (all uniform and narrowly oblong in terrestrial forms); flowers usually between a pair of bracts.*

2. C. palústris L. *Fruit* 1 mm. long, *higher than broad*, obovate, slightly obcordate, usually thickest at the base, sessile, *its lobes sharply keeled or very narrowly winged above*, and with a wide groove between them; stigmas shorter than the fruit, almost erect, usually deciduous; floating leaves crowded in a tuft, obovate, narrowed into a petiole. (*C. verna* L., in part.) — Common in quiet waters. (Eu.)

3. C. heterophýlla Pursh. *Fruit* smaller, *as broad as or broader than high*, deeply emarginate, thick, almost ventricose, sessile or nearly so, *its lobes obtusely angled*, with a small groove between them; stigmas as long as the fruit, erect, persistent; floating leaves crowded in a tuft, broadly spatulate, often retuse, abruptly narrowed into a long petiole. — Quiet water, Nfd. to Md., La., and westw.

* * * *Submersed perennial, with numerous uniform linear 1-nerved leaves; flowers without bracts; carpels separate nearly to the axis.*

4. C. autumnàlis L. Stems 7–15 cm. high; fruit large (2 mm. wide or more), flattened, circular, deeply and narrowly notched, sessile or nearly so, its lobes broadly winged, and with a very deep and narrow groove between them; stigmas very long, reflexed, deciduous; leaves all linear from a broader base, retuse or notched at the tip, 4–12 mm. long. (*C. bifida* Morong.) — Lakes and cold streams, w. Mass., L. Champlain, and w. Que. to L. Superior, and westw. (Eu.)

BUXÀCEAE (Box Family)

Perennial herbs or more often trees or shrubs, with simple opposite or alternate usually evergreen leaves, watery juice and small greenish monoecious or dioecious apetalous flowers; sepals imbricated or none; stamens opposite the sepals or indefinite; carpels 3; ovary 3-celled; styles 3, simple; ovules (in ours) geminate in the cells, suspended, the rhaphe dorsal. — A small family, often united with the *Euphorbiaceae*.

1. PACHYSÂNDRA Michx.

Flowers monoecious, in naked spikes. Calyx 4–5-parted Petals none. *Ster. Fl.* Stamens 4, separate; filaments long-exserted, thick and flat; anthers oblong-linear. *Fert. Fl.* Styles thick, awl-shaped, recurved, stigmatic down their whole length inside. Capsule deeply 3-horned, 3-celled, splitting into 3 at length 2-valved 2-seeded carpels. — Nearly glabrous low and procumbent perennial herbs, with matted creeping rootstocks, and alternate ovate or obovate coarsely toothed leaves narrowed at base into a petiole. Flowers each 1–3-bracted, the upper staminate, a few fertile ones at base, unpleasantly scented;

sepals greenish or purplish; filaments white (their size and thickness giving the name, from παχύς, *thick*, and ἀνήρ, used for *stamen*).

1. **P. procúmbens** Michx. Stems 1.5–2.3 dm. long, bearing several approximate leaves at the summit on slender petioles, and a few many-flowered spikes along the base; the intervening portion naked, or with a few small scales. — Woods, mts. of Ky., W. Va., and southw.; adv. northw. March–May.

EMPETRÀCEAE (Crowberry Family)

Low shrubby evergreens, with the foliage, aspect, and compound pollen of Heaths, *and the drupaceous fruit of* Arctostaphylos, *but the divided or laciniate stigmas, etc., of some* Euphorbiaceae. — Probably only an apetalous and degenerate form of *Ericaceae*, and comprising three genera, two within the limits of this work, the third farther south.

1. **Empetrum.** Flowers scattered and solitary in the axils. Sepals 3, petaloid.
2. **Corema.** Flowers collected in terminal heads. Calyx none.

1. ÉMPETRUM [Tourn.] L. Crowberry

Flowers polygamous, scattered and solitary in the axils of the leaves, inconspicuous, scaly-bracted. Calyx of 3 spreading and somewhat petal-like sepals. Stamens 3. Style very short; stigma 6–9-rayed. Fruit a berry-like drupe, with 6–9 seed-like nutlets, each containing an erect anatropous seed. (An ancient name, from ἐν, *upon*, and πέτρος, *a rock*.)

1. **E. nìgrum** L. (Black C.) Procumbent and spreading; branchlets and scattered linear-oblong leaves glabrous or merely pulverulent; fruit black. — Arctic Am., s. to the coast of e. Me., mts. of n. N. E. and N. Y., n. Mich., and coast of Ore. (Eurasia.) Var. purpùreum (Raf.) DC. Fruit red or purple. — Less common.

Var. **andìnum** (Philippi) DC. Branchlets and young leaves tomentose; berries reddish or plum-colored, larger and more juicy. — Nfd., and mts. of Me. and N. H. (Chili.)

2. CORÈMA D. Don. Broom Crowberry

Flowers dioecious or polygamous, in terminal heads, each in the axil of a scaly bract, and with 5 or 6 scarious imbricated bractlets, but no proper calyx. Stamens 3, rarely 4. Style slender, 3(or rarely 4–5)-cleft; stigmas narrow, often toothed. Drupe small, with 3 (rarely 4–5) nutlets. — Diffusely branched little shrubs, with subverticillate narrowly linear heath-like leaves. (Name κόρημα, *a broom*, from the bushy aspect.)

1. **C. Conràdii** Torr. Shrub, 1.5–6 dm. high, diffusely branched, nearly smooth; drupe very small, dry and juiceless when ripe. — Sandy pine-barrens and dry rocky places, N. J. and L. I. (?), Shawangunk Mts., N. Y., coast of s. e. Mass. and Me. to Nfd. — The sterile plant is handsome in flower, on account of the tufted purple filaments and brown-purple anthers.

LIMNANTHÀCEAE (False Mermaid Family)

Herbaceous plants with perfect regular 3–6-merous slightly perigynous symmetrical flowers, the persistent sepals valvate. Glands alternate with the petals. Stamens distinct. Carpels nearly distinct, with a common style, 1-ovuled, at length fleshy and indehiscent, not beaked, separating from a very short axis. Embryo straight; cotyledons very thick; radicle very short. — Low tender annuals, with alternate pinnate exstipulate leaves.

1. FLOÉRKEA Willd. False Mermaid

Sepals 3. Petals 3, shorter than the calyx, oblong. Stamens 6. Ovaries 3, opposite the sepals, united only at the base; the style rising in the center; stigmas 3. Fruit of 3 (or 1–2) roughish fleshy achenes. Seed anatropous, erect. — Small and inconspicuous herbs, with minute solitary flowers on axillary peduncles. (Named for *Gustav Heinrich Flörke*, a German botanist.)

1. F. proserpinacoìdes Willd. Leaflets 3–5, lanceolate, sometimes 2–3-cleft. — Marshes and river-banks, w. Que. to Del., Ky., and westw. Apr.–June. — Taste slightly pungent.

ANACARDIÀCEAE (Cashew Family)

Trees or shrubs, with resinous or milky acrid juice, dotless alternate leaves, and small often polygamous regular 5-merous flowers, but the ovary 1-celled and 1-ovuled, with 3 styles or stigmas. — Petals imbricated in the bud. Fruit mostly drupaceous. Seed without albumen, borne on a curved stalk that rises from the base of the cell. Stipules none. Some species pervaded by an exceedingly active poisonous principle.

1. RHÚS L. Sumach

Calyx small, 5-parted. Petals 5. Stamens 5, inserted under the edge or between the lobes of a flattened disk in the bottom of the calyx. Fruit small and indehiscent, a sort of dry drupe. — Leaves usually compound. Flowers greenish-white or yellowish. (The old Greek and Latin name.)

§ 1. SÙMAC DC. (in part). *Flowers polygamous, in a terminal thyrsoid panicle; fruit globular, symmetrical, clothed with acid crimson hairs; stone smooth; leaves odd-pinnate.* (*Not poisonous.*)

1. R. typhìna L. (Staghorn S.) Shrub or tree, 1–10 m. high, with orange-colored wood; *branches and stalks densely velvety-hairy;* leaflets 11–31, pale beneath, oblong-lanceolate, pointed, serrate. (*R. hirta* Sudworth.) — Dry or gravelly soil, e. Que. to Ont., s. to Ga., Ind., and Ia. June, July. — Apparently hybridizes with the next species. Forma laciniàta (Wood) Rehder. Leaflets and bracts more or less deeply and laciniately toothed. — A frequent form, at least in some cases pathological and with inflorescence transformed in part into contorted bracts (the *Datisca hirta* of L.). Forma dissécta Rehder. Leaves bipinnatifid to bipinnate. — An occasional form, now in cultivation.

2. R. glàbra L. (Smooth S.) *Smooth glaucous* shrub, 6–30 dm. high; leaflets 11–31, whitened beneath, lanceolate-oblong, pointed, serrate. — Common in dry soil, centr. Me., westw. and southw. June, July. Forma laciniàta (Carr.) Robinson. Leaves laciniately bipinnatifid to bipinnate. — Pa. and Del.

3. R. copallìna L. (Dwarf S.) Shrub, 0.3–2 or (especially southward) even 10 m. high; *branches and stalks downy; petioles wing-margined* between the 9–21 oblong or ovate-lanceolate often entire leaflets, which are oblique or unequal at the base, smooth and shining above. — Rocky hills, s. Me., southw. and westw. July.

§ 2. VENENÀTAE Engl. *Flowers polygamous, in loose and slender axillary panicles; fruit symmetrical, globular, glabrous or pubescent, whitish or dun-colored; the style terminal; stone striate; leaves odd-pinnate or 3-foliolate, thin.* (*Poisonous.*) Toxicodendron Mill.

4. R. Vérnix L. (Poison S. or Dogwood.) Shrub, 2–5 m. high, smooth or nearly so; *leaflets 7–13, obovate-oblong,* entire. (*R. venenata* DC.) — Swamps, w. Me. to w. Ont., and southw. June. — Our most poisonous species; also called Poison Elder.

5. R. Toxicodéndron L. (Poison Ivy, Poison Oak.) Suberect and bushy,

scrambling over fences, walls, etc., or in woods climbing by rootlets to considerable heights (var. RADICANS (L.) Torr.), sparingly pubescent or glabrate; *leaves pinnately 3-foliolate, leaflets ovate to rhombic, mostly acuminate, entire, crenulate, or irregularly and coarsely few-toothed*, paler and with some persistent or tardily deciduous pubescence beneath; *berries* whitish or cream-colored, subglobose, *glabrous or nearly so*, 5–6 *mm. in diameter*, in age sulcate. — Abundant in hedgerows, thickets, and woods. June, July. — To many persons poisonous to the touch. Passing on our western limits to a thicker-leaved smoother form (*R. Rydbergi* Small).

Var. **microcárpa** Michx. Similar; *fruit* 3–4 *mm. in diameter.* (*R. microcarpa* Steud.) — Apparently local, w. Que. to Fla., and westw.

6. **R. quercifòlia** (Michx.) Steud. (POISON OAK.) *Erect*, 3–5 dm. high; *leaflets* broadly rhombic-ovate, *conspicuously* 3–7-*lobed*, permanently and somewhat copiously pubescent beneath, rather firm in texture and somewhat veiny; *fruit* 4–5 mm. in diameter, at first *pubescent, in maturity* glabrate but *papillose.* — Woods and barrens, Va., southw. and southwestw.

§ 3. LOBÀDIUM (Raf.) DC. *Flowers polygamo-dioecious, in small solitary or clustered spikes or heads which develop in spring before the leaves; leaves 3-foliolate; fruit as in the first group.* SCHMALTZIA Desv.

7. **R. canadénsis** Marsh. Leaves soft-pubescent when young, becoming glabrate; leaflets rhombic-obovate or ovate, unequally cut-toothed, 2.5–7.5 cm. long, the terminal one cuneate at base and sometimes 3-cleft; flowers pale yellow. (*R. aromatica* Ait.) — Dry rocky banks, w. Vt. to Minn., and southw. — A straggling bush, 1–2 m. high; the crushed leaves not unpleasantly scented.

Var. **illinoénsis** (Greene) Fernald. Branchlets and petioles tomentulose; leaves permanently appressed-pubescent above, velvety beneath. (*Schmaltzia illinoensis* Greene.) — Dry sandy banks, centr. Ill.

Var. **trilobàta** (Nutt.) Gray. With smaller somewhat flabelliform and obtusish leaflets, 1.5–2.5 cm. long, crenately few-lobed or incised toward the summit. — Ill. (*Hall*), and common westw. — Unpleasantly scented.

§ 4. CÓTINUS (Adans.) DC. *Ovary becoming very gibbous in fruit, with the remains of the styles lateral; flowers in loose ample panicles, the pedicels elongating and becoming plumose; leaves simple, entire.*

8. **R. cotinoìdes** Nutt. A tree, 8–12 m. high, glabrous or nearly so; leaves thin, oval, 7–15 cm. long. (*Cotinus* Britton.) — Wooded calcareous banks, s. e. Mo. to Tenn., and southw., rare and local. — Flowers and fruit much as in the cultivated SMOKE-TREE (*R. Cotinus* L.), which is an occasional escape within our range.

CYRILLÀCEAE (CYRILLA FAMILY)

Shrubs or small trees with alternate entire thickish leaves, no stipules, and (4–)5-*parted small regular and perfect flowers. Stamens hypogynous*, 5 *or* 10, *when* 5 *alternate with the petals. Ovary* 2–5-*celled; cells* 1–4-*ovuled.* Petals (white or roseate) imbricated or convolute in bud, sessile or unguiculate. Fruit a small corky drupe or tardily dehiscent pod. Flowers racemose-spicate.

1. CYRÍLLA Garden. LEATHERWOOD. BLACK TI-TI

Petals sessile. Stamens 5, attached with the petals under a disk; anthers somewhat sagittate. Ovary 2–3-celled; ovules anatropous or half-anatropous; cotyledons terete, small; radicle superior. — Leaves oblanceolate, coriaceous, evergreen or nearly so. (Named in honor of *Dominico Cyrillo*, professor of medicine at Naples.)

1. **C. racemiflòra** L. Glabrous shrub, with shining somewhat veiny leaves and innumerable small flowers in clustered racemes. — Edges of swamps, s. e. Va., and southw. (W. I.; S. A.)

AQUIFOLIÀCEAE (Holly Family)

Trees or shrubs, with small axillary 4–8-*merous flowers, a minute calyx free from the* 4–8-*celled ovary and the* 4–8-*seeded berry-like drupe; the stamens as many as the divisions of the almost or quite* 4–8-*petaled corolla and alternate with them, attached to their very base.* Corolla imbricated in the bud. Anthers opening lengthwise. Stigmas 4–8, or united into one, nearly sessile. Seeds suspended and solitary in each cell, anatropous, with a minute embryo in fleshy albumen. Leaves simple, mostly alternate. Flowers white or greenish, mostly polygamo-dioecious. — Small family, related to the *Ebenaceae.*

1. **Ilex.** Petals or corolla-lobes oval or obovate. Stamens adnate to the base of the corolla.
2. **Nemopanthus.** Petals linear, free from each other and from the stamens.

1. ÌLEX L. Holly

Calyx 4–6-toothed. Petals 4–6, separate or united only at the base, oval or obovate, obtuse, spreading. Stamens 4–6. The berry-like drupe containing 4–6 little nutlets. — Leaves alternate. Fertile flowers inclined to be solitary, and the sterile or partly sterile flowers to be clustered in the axils. (The ancient Latin name of the Holly Oak, rather than of the Holly.)

§ 1. AQUIFÒLIUM [Tourn.] Gray. *Parts of the flower commonly in* 4's, *sometimes in* 5's *or* 6's; *drupe red or yellow, its nutlets ribbed, veiny, or* 1-*grooved on the back; leaves mostly smooth, coriaceous and evergreen.*

* *Leaves armed with spiny teeth; trees.*

1. **I. opàca** Ait. (American H.) Leaves oval, flat, the wavy margins with scattered spiny teeth; flowers in loose clusters along the base of the young branches and in the axils; calyx-teeth acute; fruit red. — Moist woodlands, Mass. to N. J., near the coast, w. to s. Mo., and southw. June. — Tree, 6–12 m. high; the deep green foliage less glossy than in the European Holly. Forma xanthocárpa Rehder. Fruit bright yellow. — New Bedford, Mass. (*Hervey*).

* * *Leaves serrate or entire, not spiny; shrubs.*

2. **I. vomitòria** Ait. (Cassena, Yaupon.) *Leaves lance-ovate or elliptical, crenate,* 2.5–3.8 cm. long; flower-clusters nearly sessile, smooth; *calyx-teeth obtuse.* (*I. Cassine* Man. ed. 6, not L.) — Va. to Fla., Ark., and Tex. May. — Leaves used for tea by the people along the coast, as they were also to make the celebrated *black drink* of the North Carolina Indians. (W. I.)

3. **I. Cassìne** L. (Dahoon H.) *Leaves oblanceolate or oblong, entire, or sharply serrate* toward the apex, with revolute margins, 5–7.5 cm. long, the *midrib and peduncles pubescent; calyx-teeth acute.* (*I. Dahoon* Walt.) — Swamps, s. Va., and southw. May, June.

Var. **myrtifòlia** (Walt.) Sarg. Leaves smaller (2.5 cm. long or less) and narrower. (*I. myrtifolia* Walt.) — Same range. May.

§ 2. PRINOÌDES Gray. *Parts of the polygamous or dioecious flowers in* 4's *or* 5's (*rarely* 6's); *drupe red or purple; nutlets striate-many-ribbed on the back; leaves deciduous; shrubs.*

4. **I. decídua** Walt. *Leaves wedge-oblong or lance-obovate, obtusely serrate, downy on the midrib* beneath, shining above, becoming thickish; peduncles of the sterile flowers longer than the petioles, of the fertile short; calyx-teeth smooth, acute. — Wet grounds, Va. to Mo., Kan., and southw. May.

5. **I. montícola** Gray. *Leaves ovate or lance-oblong, ample* (6–12 cm. long), taper-pointed, thin-membranaceous, *smooth, sharply serrate;* fertile flowers very short-peduneled; calyx ciliate. — Damp woods, Taconic and Catskill Mts., and Cattaraugus Co., N. Y., and southw. along the Alleghenies. May.

Var. **móllis** (Gray) Britton. Leaves soft-downy beneath. (*I. mollis* Gray.) — Taconic Mts., Mass. (*Hoffmann*) to N. C. At the South appearing to pass without clear limits into a form with shorter rounder leaves and tomentose calyx (*I. Beadlei* Ashe).

§ 3. PRÌNOS Gray. *Parts of the sterile flowers commonly in* 4's, 5's, *or* 6's, *those of the fertile flowers commonly in* 6's (*rarely in* 5's, 7's, *or* 8's); *nutlets smooth and even; shrubs.*

* *Leaves deciduous; fruit red or yellow.*

6. **I. verticillàta** (L.) Gray. (Black Alder, Winterberry.) *Leaves* 3–7 cm. long, oval, obovate, or wedge-lanceolate, pointed, acute at base, serrate, *downy chiefly on the veins beneath; flowers all very short-peduncled; calyx-lobes ciliate on the margins;* fruit red. — Low grounds, common. May, June. Forma chrysocárpa Robinson. Fruit yellow. — Georgetown, Mass. (*Mrs. Horner*).

Var. **tenuifòlia** (Torr.) Wats. *Leaves* thinner, smoother, *pellucid-punctículate* under a lens; fertile flowers more inclined to be solitary. (*I. bronxensis* Britton.) — A northeastern woodland form, N. S. to Ont., Mich., and N. J.

Var. **cyclophýlla** Robinson. *Leaves* small, *suborbicular*, finely pubescent upon the veins beneath, tending to be clustered at the ends of the branchlets. (Var. *padifolia* Britton, not T. & G.) — Shores of L. Erie; a similar form with small and clustered but narrower leaves on Mt. Desert I., Me. (*Rand*).

Var. **padifòlia** (Willd.) T. & G. *Leaves* 5–12 cm. long, as in the typical form, but *tomentulose on the surface* (as well as the veins) *beneath.* — Mass. to Minn., and southw.

7. **I. laevigàta** (Pursh) Gray. (Smooth Winterberry.) *Leaves* lanceolate or oblong-lanceolate, appressed-serrulate, shining above, mostly *glabrous* beneath; *sterile flowers long-peduncled; calyx-lobes not ciliate.* — Wet grounds, N. H. to the mts. of N. C. June. — Fruit larger than in the last, ripening earlier. Forma Hervèyi Robinson. Fruit bright yellow. — New Bedford, Mass. (*Hervey*).

* * *Leaves coriaceous, evergreen, shining, often dotted beneath; fruit black.*

8. **I. glàbra** (L.) Gray. (Inkberry.) Shrub, 6–9 dm. high, the *twigs ashy-puberulent; leaves wedge-lanceolate or oblong*, sparingly *toothed toward the apex*, smooth, 1.4–4.8 cm. long, 8–15 mm. wide; peduncles (1.2 cm. long) of the sterile flowers 3–6-flowered, of the fertile 1-flowered; calyx-teeth rather blunt. — Low sandy grounds, s. w. N. S.; and from Cape Ann, Mass., to Fla. and La., near the coast. June.

9. **I. lùcida** (Ait.) T. & G. Larger shrub, with *glabrous or viscid-puberulent branchlets; leaves obovate to oblanceolate*, coriaceous, *entire or remotely toothed*, short-acuminate, mostly 3–7.5 cm. long, 1.6–2.8 cm. wide, on thickish petioles 6–10 mm. in length. — Swamps, Va. to Fla. and La.

2. NEMOPÁNTHUS Raf. Mountain Holly

Flowers polygamo-dioecious. Calyx in the sterile flowers of 4–5 minute deciduous teeth, in the fertile ones obsolete. Petals 4–5, oblong-linear, spreading, distinct. Stamens 4–5; filaments slender. Drupe with 4–5 bony nutlets, light red. — A much branched shrub, with ash-gray bark, alternate deciduous entire or slightly toothed smooth leaves on slender petioles. Flowers on long slender axillary peduncles, solitary or sparingly clustered. (Name said by the author to mean "flower with a filiform peduncle," presumably from νῆμα, *a thread*, πούς, *foot*, and ἄνθος, flower.)

1. **N. mucronàta** (L.) Trel. Erect, 0.3–3 m. high; bark gray; leaves elliptic-oblong, thin, slightly paler beneath. — (*Nemopanthes fascicularis* Raf.; *Ilicioides mucronata* Britton.) — Damp cool woods, from the mts. of Va. to Nfd., Ind., Wisc., and northw.

CELASTRACEÀE (Staff Tree Family)

Shrubs with simple leaves, and small regular flowers, the sepals and the petals both imbricated in the bud, the 4 or 5 perigynous stamens as many as the petals and alternate with them, inserted on a disk which fills the bottom of the calyx and sometimes covers the ovary. Seeds arilled. Ovule anatropous; styles united into one. Fruit 2–5-celled, free from the calyx. Embryo large, in fleshy albumen; cotyledons broad and thin. Stipules minute and fugacious. Pedicels jointed.

* Leaves opposite; flowers in axillary cymes or solitary.

1. **Evonymus.** Erect shrubs. Leaves deciduous. Fruit 3–5-lobed, 3–5-valved. Aril red.
2. **Pachistima.** Dwarf evergreen shrub. Flowers very small. Fruit oblong, 2-valved. Aril white.

* * Leaves alternate; flowers in terminal racemes.

3. **Celastrus.** A shrubby climber. Fruit globose, orange, 3-valved. Aril scarlet.

1. EVÓNYMUS [Tourn.] L. Spindle Tree

Flowers perfect. Sepals 4 or 5, united at the base, forming a short and flat calyx. Petals 4–5, rounded, spreading. Stamens short, borne on the edge or face of a broad and flat 4–5-angled disk, which coheres with the calyx and is stretched over the ovary, adhering to it more or less. Style short or none. Pod 3–5-lobed, 3–5-valved, loculicidal. Seeds 1–4 in each cell, inclosed in a red aril. — Shrubs, with 4-sided branchlets, opposite serrate leaves, and loose pedunculate cymes of small flowers on axillary peduncles. (Name from εὖ, *good*, and ὄνομα, *name*, but used ironically, the plants having had the bad reputation of poisoning cattle.)

1. **E. atropurpùreus** Jacq. (Burning Bush, Waahoo.) Tree-like shrub, 2–4 m. high; *leaves petioled*, oval-oblong, pointed; parts of the *dark-purple flower* commonly in fours; *pods smooth, deeply lobed.* — N. Y. to Wisc., Neb.; southw. and westw.; also cultivated, and locally establishing itself northeastw. June. — Ornamental in autumn, its copious crimson fruit drooping on long peduncles.

2. **E. europaèus** L., the European Spindle Tree, with similar foliage but less numerous *greenish or yellowish-white flowers*, occasionally escapes from cultivation in the Atlantic States. (Introd. from Eu.)

3. **E. americànus** L. (Strawberry Bush.) Shrub, low, upright or straggling, 1–2 m. high; *leaves almost sessile, thickish*, bright green, ovate to oblong-lanceolate, *acute or pointed;* parts of the greenish-purple flowers mostly in 5's; *petals distinctly clawed; pods rough-warty, depressed*, crimson when ripe; the aril and dissepiments scarlet. — Wooded river-banks, N. Y. to Ill., Fla. and Tex. June.

4. **E. obovàtus** Nutt. *Trailing, with rooting branches;* flowering stems 3–6 dm. high; *leaves* thin and dull, obovate or oblong, *obtuse; petals without distinct claw.* (*E. americanus*, var. T. & G.) — Low or wet places, w. Ont. to Pa., Ky, and Ill.; commoner than the preceding.

2. PACHÍSTIMA Raf.

Flowers perfect. Sepals and petals 4. Stamens 4, on the edge of the broad disk lining the calyx-tube. Ovary free; style very short. Pod small, oblong, 2-celled, loculicidally 2-valved. Seeds 1 or 2, inclosed in a white membranaceous many-cleft aril. — Low evergreen shrubs, with smooth serrulate coriaceous opposite leaves and very small green flowers solitary or fascicled in the axils. (Name from παχύς, *thick*, and στίγμα, *stigma.*)

1. **P. Cánoyi** Gray. Leaves linear to linear-oblong or oblong-obovate, obtuse, 6–25 mm. long; pedicels very slender, often solitary, shorter than the leaves; fruit 4 mm. long. — Steep rocky slopes, mts. of s. Va. and W. Va.

3. CELÁSTRUS L. Staff Tree. Shrubby Bitter-sweet

Flowers polygamo-dioecious. Petals (crenulate) and stamens 5, inserted on the margin of a cup-shaped disk which lines the base of the calyx. Pod globose, orange-color and berry-like, 3-celled, 3-valved, loculicidal. Seeds 1 or 2 in each cell, erect, inclosed in a pulpy scarlet aril. — Leaves alternate. Flowers small, greenish, in raceme-like clusters terminating the branches. (An ancient Greek name for some evergreen.)

1. **C. scándens** L. (Waxwork, Climbing Bitter-sweet.) Twining shrub; leaves ovate-oblong, finely serrate, pointed. — Along streams and in thickets, Me. to Man., and southw. June. — The opening orange-colored pods, displaying the scarlet covering of the seeds, are very ornamental in autumn.

STAPHYLEÀCEAE (Bladder Nut Family)

Shrubs or small trees with opposite chiefly pinnate stipulate leaves and perfect flowers. Stamens as many as and alternate with the petals, borne outside a large disk. Fruit (in ours) a bladdery inflated 2–3-horned capsule. Seeds (in ours) with scanty albumen and straight embryo. — Chiefly Asiatic.

1. STAPHYLÈA L. Bladder Nut

Calyx deeply 5-parted, the lobes erect, whitish. Petals 5, erect, spatulate. Pistil of 3 several-ovuled carpels, united in the axis, their long styles lightly cohering. Pod large, inflated, 3-celled, at length bursting at the summit; the cells containing 1–4 bony anatropous seeds. Cotyledons broad and thin. — Upright shrubs, with opposite pinnate leaves of 3 or 5 serrate leaflets, and white flowers in drooping raceme-like clusters terminating the branchlets. Stipules and stipels deciduous. (Name from σταφυλή, *a cluster.*)

1. **S. trifòlia** L. (American B.) Leaflets 3, ovate, pointed. — Thickets, in moist soil, w. Que. and w. N. E. to Minn., and southw. May. — Shrub, 3 m. high, with greenish striped branches.

ACERÀCEAE (Maple Family)

Trees and shrubs with watery saccharine sap, opposite simple and palmately lobed or more rarely palmately or pinnately divided leaves, small regular mostly polygamous or dioecious sometimes apetalous flowers. Ovary 2-celled, 2-lobed; ovules 2 in each cell. Embryo coiled or folded; *cotyledons long and thin.* — Chiefly trees of temperate regions.

1. ÀCER [Tourn.] L. Maple

Flowers polygamo-dioecious. Calyx colored, 5(rarely 4–12)-lobed or -parted. Petals either none or as many as the lobes of the calyx, equal, with short claws if any, inserted on the margin of a perigynous or hypogynous disk. Stamens 3–12. Ovary 2-celled, with a pair of ovules in each cell; styles 2, long and slender, united only below, stigmatic down the inside. From the back of each carpel grows a wing, converting the fruit into two 1-seeded at length separable samaras or keys. — Trees or sometimes shrubs, with opposite palmately lobed leaves, and small flowers. Pedicels not jointed. (The classical name, from the Celtic *ac*, hard.)

§ 1. ÀCER *proper. Disk usually present. Leaves in ours simple, palmately lobed or cleft.*

* *Flowers in terminal racemes, greenish, appearing after the leaves; stamens* 6–8.

1. **A. pennsylvánicum** L. (STRIPED M., MOOSEWOOD.) Leaves 3-lobed at the apex, finely and sharply double-serrate, the short lobes taper-pointed and also serrate; *racemes drooping, loose; petals obovate;* fruit with large diverging wings. — Rich woods, e. Que. to w. Ont., s. to N. E., N. Y., Great L. region, and in the mts. to Ga. June. — A small and slender tree, with light green bark striped with dark lines, and greenish flowers and fruit.

2. **A. spicàtum** Lam. (MOUNTAIN M.) Leaves downy beneath, 3(or slightly 5)-lobed, coarsely serrate, the lobes taper-pointed; *racemes upright, dense,* somewhat compound; *petals linear-spatulate;* fruit with small erect or divergent wings. — Moist woods, Nfd. and Lab. to Hudson B. and Man., s. to N. E., N. Y., Great L. region, e. Ia., and in the mts. to Ga. June. — A tall shrub or small tree, with reddish fruit.

* * *Flowers in nearly sessile terminal and lateral umbellate-corymbs, greenish-yellow, appearing with the leaves.*

3. **A. sáccharum** Marsh. (SUGAR or ROCK M.) Leaves 3–5-lobed, with rounded sinuses and pointed sparingly sinuate-toothed lobes, either heart-shaped or nearly truncate at the base, whitish and smooth or a little downy on the veins beneath; flowers from terminal leaf-bearing and lateral leafless buds, drooping on very slender hairy pedicels; calyx hairy at the apex; petals none; wings of the fruit broad, usually slightly diverging. (*A. saccharinum* Wang., not L.) — Rich woods, especially northw. and along the mts. southw. Apr., May. — A large and handsome tree.

Var. **nìgrum** (Michx. f.) Britton. (BLACK SUGAR M.) *Leaves green and scarcely paler but usually downy beneath,* the lobes wider, often shorter and entire, the sinus at the base commonly closed; stipules often conspicuous. — Rich soil, w. Que. and w. N. H., southw. and westw.; sometimes appearing distinct.

* * * *Flowers in umbel-like clusters arising from separate lateral buds, and much preceding the leaves; stamens* 3–6.

4. **A. saccharìnum** L. (WHITE or SILVER M.) *Leaves very deeply 5-lobed,* with the sinuses rather acute, silvery-white (and when young downy) underneath, the divisions narrow, cut-lobed and toothed; flowers on short pedicels; *petals none; fruit woolly when young,* with large divergent wings. (*A. dasycarpum* Ehrh.) — River-banks. March, Apr. — A fine ornamental tree.

5. **A. rùbrum** L. (RED or SWAMP M.) Leaves broadly ovate to suborbicular, truncate or cordate at base, tomentose when young, soon glabrate, whitened beneath, 8–15 cm. long; the 3–5 acuminate lobes irregularly serrate and notched, the middle one oblong at base; *petals linear-oblong;* flowers (scarlet, crimson, or sometimes yellowish) on very short pedicels; but the *smooth fruit* on prolonged drooping pedicels. — Swamps and wet woods, e. Que. to w. Ont., and southw. Apr. — A medium-sized tree, with reddish twigs; the leaves varying greatly in shape, turning bright crimson in early autumn.

Var. **Drummóndii** (H. & A.) T. & G. Leaves large and firm, permanently tomentose beneath. (*A. Drummondii* H. & A.) — Mo., and southw.

Var. **trìdens** Wood. Leaves small (5–10 cm. long), obovate, narrowed or rounded and subentire or sparingly toothed below the 3 short lobes; the middle lobe broadly triangular. (*A. carolinianum* Britton, perhaps Walt.) — Local, Mass. to Fla., Mo., and Tex.

§ 2. NEGÚNDO (Moench) Koehne. *Flowers strictly dioecious. Disk none. Leaves pinnate.* NEGUNDO Moench.

6. **A. Negúndo** L. (BOX ELDER.) Leaflets 3–5 (–9), smoothish when old, very veiny, ovate, pointed, toothed: petals none; fruit smooth, with large

rather incurved wings. (*Negundo aceroides* Moench.) — River-banks, w. N. E. to Man., southw. and westw.; extensively cultivated and frequently seeding itself eastw. Apr. — A small but handsome tree, with light-green twigs, and very delicate drooping clusters of small greenish flowers rather earlier than the leaves.

SAPINDÀCEAE (Soapberry Family)

Trees, shrubs, rarely herbaceous climbers, with exstipulate chiefly alternate and compound leaves. Flowers often polygamous, mostly unsymmetrical. Stamens commonly more numerous than the petals, rarely twice as many. Embryo curved or convolute, rarely straight; cotyledons thick and fleshy. — Large family, chiefly woody climbers in the tropics.

1. **Sapindus.** Flowers subregular. Leaves alternate, pinnate.
2. **Aesculus.** Flowers irregular. Leaves opposite, palmate.

1. SAPÍNDUS [Tourn.] L. Soapberry

Flowers regular, polygamous. Sepals 4–5, imbricated in 2 rows. Petals 4–5, with a scale at the base. Stamens 8–10, upon the hypogynous disk. Ovary 3-celled, with an ascending ovule in each cell. Fruit a globose or 2–3-lobed berry, 1–3-seeded. Seed crustaceous, globose. — Trees or shrubs, with alternate abruptly pinnate leaves, and small flowers in terminal or axillary racemes or panicles. (Name a contraction of *sapo indicus, Indian soap,* having reference to the saponaceous character of the berries.)

1. **S. Drummóndi** H. & A. Tree, 6–18 m. high; leaflets 4–9 pairs, obliquely lanceolate, sharply acuminate, entire, 3.7–7.5 cm. long; the rhachis of the leaf not winged; flowers white, in a large panicle; fruit mostly globose, 1.2 cm. in diameter. (*S. acuminatus* Man. ed 6, not Raf.) — Kan. to La. and Mex.

Cardiospérmum Halicácabum L., the Balloon Vine of cultivation, an herbaceous climber with bi-ternate leaves and bladdery pods, is occasionally spontaneous. (Introd. from Tropics.)

2. AÉSCULUS L. Horse-chestnut. Buckeye

Calyx tubular, 5-lobed, often oblique or gibbous at base. Petals 4–5, more or less unequal, with claws, nearly hypogynous. Stamens 7 (rarely 6 or 8); filaments long, slender, often unequal. Style 1; ovary 3-celled, with 2 ovules in each cell. Fruit a leathery pod, 3-celled and 3-seeded, or usually by abortion 1-celled and 1-seeded, loculicidally 3-valved. Seed very large, with thick shining coat, and a large round pale scar. Cotyledons very thick and fleshy, their contiguous faces coherent, remaining under ground in germination; plumule 2-leaved; radicle curved. — Trees or shrubs. Leaves opposite, digitate; leaflets serrate, straight-veined, like a Chestnut leaf. Flowers in a terminal thyrse or dense panicle, often polygamous, most of them with imperfect pistils and sterile; pedicels jointed. Seeds farinaceous, but imbued with a bitter and narcotic principle. (The ancient name of some Oak or other mast-bearing tree.)

§ 1. EUAÉSCULUS Pax. *Fruit covered with prickles when young.*

1. **A.** Hippocástanum L. (Common H.) *Corolla spreading, white,* spotted with purple and yellow, of 5 petals; stamens declined; leaflets 7. — Commonly planted and occasionally self-sown. (Introd. from Asia *via* Eu.)

2. **A. glàbra** Willd. (Fetid or Ohio B.) Stamens curved, longer than the pale *yellow corolla* of 4 *upright* petals; leaflets usually 5. — River-banks, w. Pa. to Mich., Mo., Kan., and southw. June. — A large tree; the bark exhaling an unpleasant odor, as in the rest of the genus. Flowers small, not showy.

Var. argûta (Buckley) Robinson. Leaflets mostly 6 or 7, lanceolate, attenuate, sharply serrate. (*A. arguta* Buckley.) — Ia. (*Mills*), Mo. (*Bush*), to Kan. and Tex.

§ 2. PÀVIA [Boerh.] Pers. *Fruit smooth; petals* 4, *conniving; the* 2 *upper smaller and longer than the others, with a small rounded blade on a very long claw.*

3. A. octándra Marsh. (Sweet B.) *Stamens included* in the yellow corolla; *calyx oblong-campanulate;* leaflets 5, sometimes 7, glabrous, or often minutely downy underneath. (*A. flava* Ait.) — Rich woods, Pa. to Wisc., Ia., and southw. May. — A large tree or a shrub.

Var. hýbrida (DC.) Sarg. Calyx and corolla tinged with flesh-color or dull purple; leaflets commonly downy beneath. (*A. flava*, var. *purpurascens* Gray.) — W. Va., southw. and westw.

4. A. Pàvia L. (Red B.) Stamens not longer than the corolla, which is bright red, as well as the *tubular calyx;* leaflets glabrous or soft-downy beneath. — Fertile valleys, Va., Ky., Mo., and southw. May. — A shrub or small tree.

BALSAMINÀCEAE. (Touch-me-not Family)

Herbs or undershrubs with bland watery juice, alternate simple exstipulate leaves, irregular flowers, and petaloid imbricated spurred calyx. Stamens 5, *with short flat filaments and introrse more or less connivent anthers. Ovary* 5-*celled. Seeds without albumen; embryo straight.* — Ours glaucous succulent annuals.

1. IMPÀTIENS [Rivinius] L. Balsam. Jewelweed

Sepals apparently only 4; the anterior one notched at the apex (probably two combined); the posterior one (appearing anterior as the flower hangs on its stalk) largest, and forming a usually spurred sac. Petals 2, 2-lobed (each a pair united). Filaments appendaged with a scale on the inner side, the 5 scales connivent over the stigma; anthers introrse. Pod with evanescent partitions, and a thick axis bearing several anatropous seeds; valves 5, coiling elastically and projecting the seeds in dehiscence. — Leaves in ours ovate or oval, coarsely toothed, petioled. Flowers axillary or panicled, often of two sorts, *viz.*, the larger ones which seldom ripen seeds; and very small ones which are fertilized early in the bud, their floral envelopes never expanding but forced off by the growing pod and carried upward on its apex. (Name from the sudden bursting of the pods when touched, whence also the popular appellation.)

1. I. pállida Nutt. (Pale Touch-me-not.) *Flowers pale-yellow, sparingly dotted* with brownish-red; *sac* dilated and very obtuse, *broader than long*, tipped with a short incurved spur. (*I. aurea* Muhl.?) — Moist shady places and along rills, in rich soil, n. Me. and w. N. E., westw. and southw. July–Sept. — Larger and greener than the next, with larger flowers. A form with unspotted flowers occurs.

2. I. biflòra Walt. (Spotted Touch-me-not.) *Flowers orange-color, thickly spotted with reddish brown; sac longer than broad*, acutely conical, tapering into a *strongly inflexed spur* half as long as the sac. (*I. fulva* Nutt.) — Rills and shady moist places. June–Sept. — Plant 6–8 dm. high. Forms with spotless, whitish, or roseate flowers have been found.

I. nòli-tángere L., of Eurasia and n. w. Am., with pale yellow flowers and the sac much longer than broad, is reported from Ottawa, Ont. (*Macoun*).

RHAMNÀCEAE (Buckthorn Family)

Shrubs or small trees, with simple leaves, small and regular flowers (sometimes apetalous), with the 4 *or* 5 *perigynous stamens as many as the valvate sepals and alternate with them, accordingly opposite the petals! Drupe or pod*

with only one erect seed in each cell, not arilled. Petals folded inwards in the bud, hooded or concave, inserted with the stamens into the edge of the fleshy disk which lines the short tube of the calyx and sometimes unites it to the lower part of the 2–5-celled ovary. Ovules solitary, anatropous. Stigmas 2–5. Embryo large, with broad cotyledons, in sparse fleshy albumen. Flowers often polygamous, sometimes dioecious. Leaves mostly alternate; stipules small or obsolete. Branches often thorny. — Slightly bitter and astringent; the fruit often mucilaginous, commonly rather nauseous or drastic.

* Calyx and disk free from the ovary.

1. **Berchemia**. Petals sessile, entire, as long as the calyx. Drupe with thin flesh and a 2-celled bony putamen.
2. **Rhamnus**. Petals small, short-clawed, notched, or none. Drupe berry-like, with 2–4 separate seed-like nutlets.

* * Calyx with the disk adherent to the base of the ovary.

3. **Ceanothus**. Petals long-clawed, hooded. Fruit dry, at length dehiscent.

1. BERCHÈMIA Neck. Supple-jack

Calyx with a very short and roundish tube; its lobes equaling the 5 oblong sessile acute petals, longer than the stamens. Disk very thick and flat, filling the calyx-tube and covering the ovary. Drupe ellipsoid, with thin flesh and a bony 2-celled putamen. — Woody high-climbing twiners, with the pinnate veins of the leaves straight and parallel, the small greenish-white flowers in small panicles. (Name unexplained, probably personal.)

1. **B. scándens** (Hill) Trel. Glabrous; leaves oblong-ovate, acute, scarcely serrulate; style short. (*B. volubilis* DC.) — Damp soils, Va. to Mo., and southw. June. — Stems tough and very lithe, whence the popular name.

2. RHÁMNUS [Tourn.] L. Buckthorn

Calyx 4–5-cleft; the tube campanulate, lined with the disk. Petals small, short-clawed, notched at the end, wrapped around the short stamens, or sometimes none. Ovary free, 2–4-celled. Drupe berry-like (black), containing 2–4 separate seed-like nutlets, of cartilaginous texture. — Shrubs or small trees, with loosely pinnate-veined leaves, and greenish perfect, polygamous, or dioecious flowers, in axillary clusters. (The ancient Greek name.)

§ 1. EURHÁMNUS Grisch. *Flowers usually dioecious; nutlets and seeds deeply grooved on the back; rhaphe dorsal; cotyledons foliaceous, the margins revolute.*

* *Calyx-lobes and stamens* 5; *petals wanting.*

1. **R. alnifòlia** L'Hér. A low shrub; leaves oval, acute, serrate, nearly straight-veined; fruit 3-seeded. — Swamps, Nfd. to B. C., s. to N. J., Pa., Ill., Neb., Wyo., etc. June.

* * *Calyx-lobes, petals, and stamens* 4.

2. **R. cathártica** L. (Common B.) *Leaves ovate*, minutely serrate; *fruit 3–4-seeded;* branchlets rigid, often spine-like. — Cultivated for hedges; locally naturalized eastw. May, June. (Introd. from Eu.)

3. **R. lanceolàta** Pursh. Tall unarmed shrub; *leaves oblong-lanceolate* and acute, or on flowering shoots oblong and obtuse, finely serrulate, smooth or minutely downy beneath; the yellowish-green flowers of two forms on distinct plants, both perfect; one with short pedicels clustered and with a short included style; the other with pedicels oftener solitary, style exserted; petals deeply notched; *fruit 2-sceded.* — Hills and river-banks, Pa. to Neb., southw. and westw. May.

§ 2. FRÁNGULA S. F. Gray. *Flowers perfect; nutlets and seeds not furrowed; cotyledons flat, thick; rhaphe lateral.*

4. R. caroliniàna Walt. Thornless shrub or small tree; leaves 7–13 cm long, oblong, obscurely serrulate, nearly glabrous, deciduous; *flowers* 5-merous, in one form *solitary in the axils*, in another in *short-peduncled umbels;* drupe globose, 3-seeded. — Swamps and river-banks, rarely on dry rocky hills, N. J. to Kan., and southw. June.

5. R. FRÁNGULA L., with *sessile umbels*, is established in Ont., on L. I., and in n. N. J. (Introd. from Eu.)

3. CEANÒTHUS L. RED-ROOT

Calyx 5-lobed, incurved; the lower part cohering with the thick disk to the ovary, the upper separating across in fruit. Petals hooded, spreading, on slender claws longer than the calyx. Filaments elongated. Fruit 3-lobed, dry and splitting into its 3 carpels when ripe. — Shrubby plants; flowers in little umbel-like clusters, forming dense panicles or corymbs at the summit of naked flower-branches; calyx and pedicels colored like the petals. (An obscure name used by Theophrastus, probably misspelled.)

1. C. americànus L. (NEW JERSEY TEA.) *Leaves ovate* or oblong-ovate, 2.4–5.5 *cm. broad, acutish to acuminate*, 3-ribbed, serrate, more or less pubescent, often slightly heart-shaped at base; common peduncles elongated. — Dry woodlands and gravelly shores, centr. Me. to w. Ont., and southw. July. — Stems 3–9 dm. high from a dark red root; branches downy. Flowers in pretty white clusters, on leafy shoots of the same year. The leaves were used for tea during the American Revolution.

2. C. ovàtus Desf. *Leaves* narrowly oval or *elliptical-lanceolate*, 7–22(–26) *mm. broad, obtuse* or rounded at the apex, finely glandular-serrate, glabrous or nearly so, as well as the short common peduncles. — Dry rocky or sandy soil, w. Vt. and e. Mass. to Man., Minn., Ill., and southwestw.; rare eastw. May. Var. PUBÉSCENS T. & G. has leaves permanently sordid-tomentose. — Ia. and southwestw.

VITACEAE (VINE FAMILY)

Shrubs with watery acid juice, usually climbing by tendrils, with small regular greenish commonly polygamous flowers, a minute or truncated calyx, its limb mostly obsolete, and the stamens as many as the valvate petals and opposite them! Berry 2-celled, usually 4-seeded. Petals 4–5, very deciduous, hypogynous or perigynous. Filaments slender; anthers introrse. Style short or none; stigma slightly 2-lobed; ovary 2-celled, with 2 erect anatropous ovules from the base of each cell. Seeds bony, with a minute embryo at the base of the hard albumen. Stipules deciduous. Leaves alternate, palmately veined or compound; tendrils and flower-clusters opposite the leaves.

* No distinct hypogynous disk; some or all the tendril-branches with dilated adhesive tips.

1. **Psedera**. Corolla expanding. Leaves digitate.

** Ovary surrounded by a nectariferous or glanduliferous disk; tendrils coiling, naked-tipped.

2. **Cissus**. Corolla expanding. Disk cupular. Berry with scanty pulp, inedible. Leaves simple or pinnately compound.

3. **Vitis**. Corolla caducous without expanding. Hypogynous glands 5, alternate with the stamens. Fruit pulpy. Leaves simple.

1. PSÉDERA Neck. VIRGINIA CREEPER. WOODBINE

Calyx slightly 5-toothed. Petals concave, thick, expanding before they fall. Disk none. — Woody climbers, with digitate leaves; leaflets 5 (3–7), oblong-

lanceolate, rather coarsely serrate. Flower-clusters cymosely compound. Tendrils branched, their tips twining or affixing themselves by enlarged terminal adhesive disks. (Name supposedly intended as a contraction of ψεῦδος, *false*, and *Hedera*, the Ivy.) AMPELOPSIS Michx., in part. PARTHENOCISSUS Planch.

1. **P. quinquefòlia** (L.) Greene. *Glabrous* even upon the young shoots; *leaflets* dull green, *decidedly paler beneath*, distinctly *petiolulate; tendrils with* 5–12 rather long *branches* mostly *ending in adhesive disks;* peduncles 1–4 cm. long; *inflorescence* paniculate, its main *branches unequal;* fruit subglobose, scarcely fleshy, about 6–7 mm. in diameter. (*Ampelopsis* Michx.; *Parthenocissus* Planch.) — Copses, etc., s. N. H., westw. and southw., common. (Mex., W. I.)

Var. **hirsùta** (Donn) Rehder. Branchlets, tendrils, petioles, and to some extent the leaflets *pubescent* at least when young; aërial rootlets often present; otherwise like the typical form. (*Ampelopsis quinquefolia*, var. *pubescens* Bailey.) — Vt. to Ia., southw. and southwestw.

Var. **Saint-Paúlii** (Koehne & Graebner) Rehder. Somewhat pubescent upon the younger parts; aërial rootlets more prevalent than in the other forms of the species; *leaflets cuneate to a sessile or scarcely petiolulate base;* cymules somewhat racemosely arranged, rendering the elongated main branches of the inflorescence subcylindric. — Ia., Ill., and southwestw.

2. **P. vitàcea** (Knerr) Greene. Glabrous or sparingly pubescent; *leaflets* deep green, thin, somewhat shining above, *scarcely paler beneath; tendrils with* 2–5 long *twining branches*, these only exceptionally ending in adhesive disks; aërial rootlets none; peduncles mostly 4–8 cm. long; inflorescence regularly dichotomous, the primary branches nearly equal; fruit somewhat obovoid, 6–10 mm. in diameter, more fleshy than in the preceding species. (*Ampelopsis quinquefolia* of auth., in part, not Michx.; *Parthenocissus vitacea* Hitchc.) — Moist woods, alluvial thickets, etc., centr. Me. to Assina. and Tex., common.

2. CÍSSUS L.

Flowers perfect or sometimes polygamous, 4-merous or (in ours) 5-merous. Petals expanding. Disk cup-shaped, surrounding the base of the ovary. Berry inedible, with scanty pulp. Seeds usually triangular-obovate. Tendrils in our species few and mostly in the inflorescence. — A vast genus, mainly tropical. (Greek name of the Ivy.) AMPELOPSIS Michx., in part.

1. **C. Ampelópsis** Pers. Nearly glabrous; *leaves heart-shaped* or truncate at the base; coarsely and sharply toothed, acuminate, *not lobed;* panicle small and loose; style slender; berries of the size of a pea, 1–3-seeded, bluish or greenish. (*Ampelopsis cordata* Michx., not *C. cordata* Roxb.) — River-banks, Va. to Neb., Tex., and Fla. June.

2. **C. arbòrea** (L.) Des Moulins. (PEPPER-VINE.) Nearly glabrous, bushy and rather upright; *leaves twice pinnate or ternate*, the leaflets cut-toothed; flowers cymose; calyx 5-toothed; disk very thick, adherent to the ovary; berries black, obovoid. (*C. stans* Pers.; *Ampelopsis arborea* Rusby.) — Rich soils, Va. to Mo., and southw.

3. **C. incìsa** (Nutt.) Des Moulins. A stout vine, with somewhat *succulent* deeply *3-parted or pinnately 3-foliolate leaves*, the leaflets ovate or obovate, cuneate, coarsely and irregularly toothed; inflorescence suggesting a compound umbel. — Open sandy or rocky woods, "Mo." and Kan. to Tex. and Fla.

3. VÌTIS [Tourn.] L. GRAPE

Flowers polygamo-dioecious (some plants with perfect flowers, others staminate with at most a rudimentary ovary), 5-merous. Calyx very short, usually with a nearly entire border or none at all. Petals separating only at base and falling off without expanding. Hypogynous disk of 5 nectariferous glands alternate with the stamens. Berry pulpy. Seeds pyriform, with beak-like base. — Plants climbing by the coiling of naked-tipped tendrils. Flowers in a

compound thyrse, very fragrant; pedicels mostly umbellate-clustered. Leaves simple, rounded and heart-shaped. (The classical Latin name.)

Lower surface of leaves velvety-tomentose or covered with floccelent wool.
- Berries large, 14–18 mm. in diameter . . . . . 1. *V. labrusca.*
- Berries smaller, rarely over 12 mm. in diameter.
  - Branchlets tereto or nearly so, glabrous, glabrate, or retaining only floccelent remnants of wool.
    - Branchlets, petioles, and lower surface of leaves covered with somewhat persistent reddish floccelent wool . . . . . 2. *V. aestivalis.*
    - Branchlets even when young glabrous or nearly so; lower surface of leaves very pale and glaucous, at length nearly smooth . . . 3. *V. bicolor.*
  - Branchlets distinctly ang'ed, covered with a fine dense and persistent gray tomentum . . . . . 4. *V. cinerea.*

Lower surface of the leaves merely pubescent (chiefly along or in the axils of the nerves) or glabrous.
- Leaves very glaucous or even whitened beneath . . . . . 3. *V. bicolor.*
- Leaves green beneath.
  - Bark of stem loose and shredding; berries 7–10 mm. in diameter.
    - Leaves ovate to suborbicular; berries mostly acid; tall climbers.
      - Teeth of leaves narrowly deltoid or even lanceolate, sharply acuminate, and often slightly falcate; berries blue, with copious bloom 6. *V. vulpina.*
      - Teeth of leaves broadly deltoid, cuspidate; berries black or dark purple, with little or no bloom.
        - Leaves scarcely or not at all 3-lobed; the basal sinus mostly rather deep, narrow, and acutish . . . . . 5. *V. cordifolia.*
        - Leaves habitually and rather incisely 3(-5)-lobed; the basal sinus mostly wide, shallow, and rounded . . . . . 7. *V. palmata.*
    - Leaves reniform or depressed-ovate, broader than long; berries sweet; bushy or sprawling . . . . . 8. *V. rupestris.*
  - Bark of stem close and firm; berries 12–18 mm. in diameter . . . 9. *V. rotundifolia.*

§ 1. EUVÌTIS Planch. *Bark loose and shreddy; tendrils forked; nodes solid.*

* *A tendril (or inflorescence) opposite each of several successive leaves.*

1. V. labrúsca L. (Northern Fox G.) Branchlets and young leaves very woolly; leaves large, entire or deeply lobed, slightly dentate, continuing rusty-woolly beneath; fertile panicles compact; berries large. — Moist or dry thickets, N. E. to the Allegheny Mts., and s. to Ga.; also n. w. Ind. — Fruit ripe in Sept. or Oct., dark purple or amber-color, with a tough musky pulp. Improved by cultivation, it has given rise to the Isabella, Catawba, Concord, and other varieties.

* * *Tendrils intermittent (none opposite each third leaf).*

← *Leaves pubescent and floccose, especially beneath and when young.*

2. V. aestivàlis Michx. (Summer or Pigeon G.) *Branchlets terete*, loosely pubescent; *leaves* large, unlobed or more or less deeply and obtusely 3–5-lobed, with short broad teeth, very woolly and mostly red or rusty when young, *tawny-flocculent even in age;* petioles rather short, pubescent; berries middle-sized, black, with a bloom, in compact bunches. — Thickets, s. N. H. to Fla., w. to Kan. and Tex. May, June. — Berries pleasant, ripe in Sept.

3. V. bicolor Le Conte. (Summer G.) *Branchlets terete*, glabrous or nearly so; petioles long, glabrous; *leaves* thickish, very *glaucous* and *early glabrate* beneath; teeth less salient; otherwise resembling the preceding. — N. H. to N. C., and westw.

4. V. cinèrea Engelm. (Sweet Winter G.) *Branchlets angular;* pubescence whitish or grayish, persistent; leaves entire or slightly 3-lobed; inflorescence large and loose; berries small, black, without bloom. — Centr. Ill. to Kan. and Tex.

← ← *Leaves glabrous and mostly shining, or short-hairy especially on the ribs beneath, incisely lobed or undivided.*

5. V. cordifòlia Michx. (Frost or Chicken G.) Leaves 7.5–10 cm. wide, unlobed or slightly 3-lobed, cordate with a deep acute sinus, acuminate, coarsely and sharply toothed; *stipules small;* inflorescence ample, loose; *berries* small, *black and shining*, very acerb, ripening after frosts; seeds 1 or 2, with *prominent rhaphe.* (*V. Baileyana* Munson.) — Thickets and stream-banks, Pa., s.

N. Y.? to centr. Ill., Mo., Neb., and southw. May, June. Var. FOÉTIDA Engelm., of the Mississippi Valley, has unpleasantly aromatic fruit.

6. V. vulpìna L. (RIVER-BANK or FROST G.) Differing from the last in the *larger* and more persistent *stipules* (4–6 *mm. long*), more shining and usually 3-lobed leaves with a broad rounded or truncate sinus and large acute or acuminate teeth; smaller compact inflorescence; *berries* 8–10 mm. in diameter, *blue, with a bloom*, acid and very juicy, ripening from Sept. to Nov.; *rhaphe indistinct.* (*V. riparia* Michx.) — Stream-banks or near water, N. B. to W. Va., N. Dak., and Kan. Var. PRAÈCOX Bailey has small sweet early fruit. — Mo.

7. V. palmàta Vahl. (RED or CAT G.) *Branches bright red;* leaves dark green and dull, 3–5-lobed, with a *broad sinus*, the lobes usually long-acuminate; inflorescence large and loose; *berries black, without bloom*, ripening late; seeds very large and rounded; otherwise like no. 6. (*V. rubra* Michx.) — Ill., Mo., and southw.

8. V. rupéstris Scheele. (SAND or SUGAR G.) Usually *low and bushy*, often *without tendrils;* leaves rather small, shining, broadly cordate, abruptly pointed, with broad coarse teeth, rarely a little lobed; *berries* rather small, *sweet*, in very small close bunches, ripe in Aug. — Sandy banks, hills, etc., s. Pa. (*Porter*) to Mo., and southw. Var. DISSÉCTA Eggert has more ovate and somewhat laciniately toothed leaves. — Mo.

§ 2. MUSCADÍNIA Planch. *Bark closely adherent on the branches; pith continuous through the nodes; tendrils simple, intermittent; seeds with transverse wrinkles on both sides.*

9. V. rotundifòlia Michx. (MUSCADINE, BULLACE, or SOUTHERN FOX G.) Leaves shining both sides, small, rounded, heart-shaped at the base, with broad and bluntish teeth, seldom lobed; panicles small, densely flowered; berries large (1.2–1.8 cm. in diameter), musky, purplish, without a bloom, with a thick and tough skin, ripe early in autumn. (*V. vulpina* Man. ed. 5, not L.) — River-banks, Del. (*Commons*) to Ky., Mo., Kan., and southw. May. — Branchlets minutely warty. This is the original of the Scuppernong Grape, etc.

TILIÀCEAE (LINDEN FAMILY)

Trees (rarely herbs), with the mucilaginous properties, fibrous bark, valvate calyx, etc., of the Mallow Family; *but the sepals deciduous, petals imbricated in the bud, the stamens usually polyadelphous, and the anthers 2-celled.* — Represented in northern regions by the single genus

1. TÍLIA [Tourn.] L. LINDEN. BASSWOOD

Sepals 5. Petals 5, spatulate-oblong. Stamens numerous; filaments cohering in 5 clusters with each other (in European species), or with the base of a spatulate petal-like body placed opposite each of the real petals. Pistil with a 5-celled ovary, and 2 half-anatropous ovules in each cell, a single style, and a 5-toothed stigma. Fruit dry and woody, indehiscent, globular, becoming 1-celled and 1–2-seeded. Embryo in hard albumen; cotyledons broad and thin, 5-lobed, crumpled. — Fine trees, with soft and white wood, very fibrous and tough inner bark, more or less heart-shaped and serrate alternate leaves (oblique and often truncate at the base), deciduous stipules, and small cymes of flowers hanging on an axillary peduncle which is united to a ligulate membranaceous bract. Flowers cream-color, honey-bearing, fragrant. (The classical Latin name.)

1. T. americàna L. (BASSWOOD.) *Leaves* large, *green and glabrous* or nearly so; floral bract usually tapering or stalked at base; *fruit* ovoid, *obscurely ribbed.* — Rich woods. May, June. — Here rarely called LIME-TREE, oftener WHITEWOOD, commonly BASSWOOD; the last name now obsolete in England.

2. T. Michaúxii Nutt. *Leaves* smaller (5–7.5 cm. long), rather densely *pubescent and grayish-green beneath;* floral bract usually rounded at base; fruit

globose, smaller, 6 mm. thick. (*T. pubescens* Man. ed. 6, not Ait.) — Ct. to Fla., and westw.

3. T. heterophýlla Vent. (White B.) *Leaves* larger, smooth and bright green above, *silvery-whitened* with a fine down *underneath;* bract usually tapering at base. — Chiefly on limestone, s. N. Y. and mts. of Pa. to s. Ill., and southw.

MALVÀCEAE (Mallow Family)

Herbs or shrubs, with alternate stipulate leaves and regular flowers, the calyx valvate and the corolla convolute in the bud, numerous stamens monadelphous in a column and united at base with the short claws of the petals, 1-celled anthers, and kidney-shaped seeds. Sepals 5, united at base, persistent, often involucellate with a whorl of bractlets forming a sort of exterior calyx. Petals 5. Anthers kidney-shaped, opening along the top. Pistils several, the ovaries united in a ring or forming a several-celled pod. Seeds with little albumen; embryo curved, the leafy cotyledons variously doubled up. — Mucilaginous innocent plants, with tough bark and palmately-veined leaves. Flower-stalks with a joint, axillary.

Tribe I. **MÁLVEAE.** Column of stamens anther-bearing at the top. Ovaries and carpels 5-20 or more, closely united in a ring around a central axis, from which they separate after ripening.

* Stigmas terminal, capitate; carpels 1-few-seeded, usually dehiscent.

1. **Abutilon.** Involucel none. Seeds 3-9 in each cell.
2. **Sphaeralcea.** Bractlets 3. Seeds 2 or 3 in each cell.
3. **Modiola.** Bractlets 3. Seeds 2 in each cell, with a transverse partition between them.
4. **Malvastrum.** Involucel of 3 bractlets or none. Seed solitary, filling the cell, ascending.
5. **Sida.** Involucel none. Seed solitary in each cell, pendulous.

* * Stigmas occupying the inner face of the styles; carpels 1-seeded, falling away separately.

6. **Althaea.** Involucel of 6-9 bractlets.
7. **Malva.** Involucel of 3 bractlets. Petals obcordate. Carpels rounded, beakless.
8. **Callirhoë.** Involucel of 1-3 bractlets or none. Petals truncate. Carpels beaked.
9. **Napaea.** Involucel none. Flowers dioecious. Stamens few (15-20). Carpels beakless.

Tribe II. **HIBÍSCEAE.** Column of stamens anther-bearing for a considerable part of its length, naked and 5-toothed at the very apex. Pod mostly 5-celled, loculicidal, leaving scarcely any axis in the center after opening.

10. **Kosteletzkya.** Involucel of several bractlets. Pod 5-celled, 5-seeded.
11. **Hibiscus.** Involucel of many bractlets. Pod 5-celled, many-seeded.

1. ABÙTILON [Tourn.] Mill. Indian Mallow

Carpels 2-9-sceded, at length 2-valved. Radicle ascending or pointing inward. Otherwise as in *Sida.* (Name of unknown origin.)

1. A. Theophrásti Medic. (Velvet Leaf.) Tall annual, 6-12 dm. high; leaves roundish-heart-shaped, taper-pointed, velvety; peduncles shorter than the leaf-stalks; corolla yellow; carpels 12-15, hairy, beaked. (*A. Avicennae* Gaertn.; *A. Abutilon* Rusby.) — Waste places, vacant lots in cities, etc. (Nat. from India.)

2. SPHAERÁLCEA St. Hil.

Ovules and seeds usually 2 or 3 in each cell. Characters otherwise as in *Malvastrum.* (Name from σφαῖρα, *a sphere*, and ἀλκέα, *a mallow* — from the commonly spherical fruit.)

1. S. remòta (Greene) Fernald. Perennial, erect, bushy-branched, 1-2 m. high, densely and stellately pubescent; leaves maple-shaped, 5-7-cleft; flowers clustered in the upper axils and subspicate; calyx densely pubescent, its caudate-acuminate lobes 1-1.5 cm. long; petals rose-color. (*S. acerifolia* Man. ed. 6, not Nutt.) — Known only from a gravelly island in the Kankakee R., Ill.

3. MODÌOLA Moench.

Calyx with a 3-leaved involucel. Petals obovate. Stamens 10–20. Stigmas capitate. Carpels 14–20, kidney-shaped, pointed, and at length 2-valved at the top; the cavity divided into two by a cross partition, with a single seed in each cell. — Humble procumbent or creeping annuals or biennials, with cut leaves and small purplish flowers solitary in the axils. (Name from *modiolus*, the broad and depressed fruit resembling in shape the Roman measure of that name.)

1. **M. caroliniàna** (L.) G. Don. Hairy; leaves 3–5-cleft and incised; fruit hispid at the top. (*M. multifida* Moench.) — Low grounds, Va. and southw. (Trop. Am.)

4. MALVÁSTRUM Gray. False Mallow

Calyx with an involucel of 2 or 3 bractlets, or none. Petals notched at the end or entire. Styles 5 or more; stigmas capitate. Carpels as in *Malva*, or else as in *Sida*, but the solitary kidney-shaped seed ascending and the radicle pointing downward, as in the former. (Name altered from *Malva*.)

1. **M. angústum** Gray. (Yellow F.) Annual, slightly hairy, erect, 1.5–3 dm. high; leaves lance-oblong or linear, with scattered fine callous teeth; flowers in the upper axils, on short peduncles; bractlets and stipules setaceous; petals yellow, scarcely exceeding the calyx; carpels 5, kidney-shaped, smooth, at length 2-valved. — Gravelly and rocky hills, centr. Tenn. to Ia. and Kan. Aug.

2. **M. coccíneum** (Pursh) Gray. (Red F.) Perennial, low and hoary; leaves 5-parted or pedate; flowers in short spikes or racemes, the pink-red petals very much longer than the calyx; carpels 10 or more, reticulated on the sides and indehiscent. — Man. and w. Ia. to Tex., and westw.

5. SÌDA L.

Calyx naked at the base, 5-cleft. Petals entire, usually oblique. Styles 5 or more, tipped with capitate stigmas; the ripe fruit separating into as many 1-seeded carpels, which are closed, or commonly 2-valved at the top, and tardily separate from the axis. Seed pendulous. Embryo abruptly bent; the radicle pointing upward. (A name used by Theophrastus.)

1. **S. hermaphrodìta** (L.) Rusby. A smooth tall (1.2–3 m. high) perennial; *leaves 3–7-cleft*, the lobes oblong and pointed, toothed; *flowers white, umbellate-corymbed*, 2.5 cm. wide; carpels 10, pointed. (*S. Napaea* Cav.) — Glades and river-banks, Pa. to Tenn., rare; cultivated in old gardens.

2. **S. Elliòttii** T. & G. A smooth erect perennial, 3–12 dm. high; *leaves linear*, serrate, short-petioled; peduncles axillary, 1-flowered, short; *flowers yellow*, rather large; *carpels* 9–10, *slightly and abruptly pointed*, forming a depressed fruit. — Sandy soil, s. Va. to s. Mo., and southw. May–Aug.

3. **S. spinòsa** L. Annual weed, minutely and softly pubescent, low (2.5–5 dm. high), much branched; *leaves ovate-lanceolate or oblong*, serrate, rather long-petioled; peduncles axillary, 1-flowered, shorter than the petiole; *flowers yellow*, small; *carpels* 5, combined into an ovoid fruit, *each splitting at the top into 2 beaks*. — Waste places, Mass. to Mich., Kan., and southw., where common. — A little tubercle at the base of the leaves on the stronger plants gives the specific name, but it cannot be called a spine. (Nat. from the Tropics.)

6. ALTHAÈA L. Marsh Mallow

Calyx surrounded by a 6–9-cleft involucel. Otherwise as in *Malva*. (Old Greek and Latin name, from ἄλθειν, *to cure*, in allusion to its healing properties.)

1. **A. officinàlis** L. (Marsh Mallow.) Stem erect, 6–12 cm. high; leaves ovate or slightly heart-shaped, toothed, sometimes 3-lobed, velvety-downy; peduncles axillary, many-flowered; flowers pale rose-color. — Salt marshes,

coast of N. E. and N. Y., also locally westw. to Mich. and Ark. Aug., Sept. — Perennial root thick, abounding in mucilage. (Nat. from Eu.)

A. CANNABÌNA L., with digitately 5-parted leaves, is said to be somewhat established at Washington, D. C. (Adv. from Eu.)

A. ROSEA Cav., the HOLLYHOCK of gardens, sometimes persists after cultivation.

7. MÁLVA [Tourn.] L. MALLOW

Calyx with a 3-leaved involucel at the base, like an outer calyx. Petals obcordate. Styles numerous, stigmatic down the inner side. Fruit depressed, separating at maturity into as many 1-seeded and indehiscent round kidney-shaped blunt carpels as there are styles. Radicle pointing downward. (An old Latin name, from the Greek name, μαλάχη, having allusion to the emollient leaves.)

** Flowers fascicled in the axils.*

1. M. ROTUNDIFÒLIA L. (COMMON M., CHEESES.) *Stems procumbent* from a deep biennial root; *leaves* round-heart-shaped, on very long petioles, crenate, *obscurely lobed;* petals twice the length of the calyx, whitish; carpels pubescent, even. — Waysides and cultivated grounds, common. (Nat. from Eu.)

2. M. VERTICILLÀTA L. *Erect annual*, with round *crenately 5–7-lobed leaves; flowers* small, pale, *sessile*, crowded in the axils; carpels slightly reticulated. — Roadsides, waste places, etc., N. S., Que., and w. Vt.; Pa. (Nat. from Asia.) M. CRÍSPA L. (the CURLED M.), which scarcely differs save in its *crisped leaves*, is occasionally spontaneous about gardens, etc. (Adv. from Eu.)

3. M. SYLVÉSTRIS L. (HIGH M.) Biennial; *stem erect, branched*, 6–9 dm. high; *leaves sharply 5–7-lobed;* petals thrice the length of the calyx, large, purple and rose-color; carpels wrinkled-veiny. — Waysides and about gardens, rarely escaped from cultivation. (Introd. from Eu.)

*** Flowers only in the upper axils, somewhat racemose or paniculate.*

4. M. MOSCHÀTA L. (MUSK M.) A low perennial, with mostly *simple pubescence; stem-leaves 5-parted, and the divisions once or twice parted or cleft* into linear lobes, faintly musky-scented; flowers rose-color or white, large, on short peduncles crowded on the stem and branches; fruit downy. — Fields and roadsides, abundant in e. Canada and n. N. E., occasional elsewhere. (Nat. from Eu.)

5. M. ÁLCEA L. Similar, with *short stellate pubescence; stem-leaves only once 5-parted or -cleft*, the lobes incised; large flowers as in the last; fruit smooth; bractlets of the involucel ovate. — Escaped from gardens in N. E., Pa., and Mich. (Introd. from Eu.)

8. CALLÍRHOË Nutt. POPPY MALLOW

Calyx either naked or with a 3-leaved involucel at its base. Petals wedge shaped and truncate (usually red-purple). Styles, etc., as in *Malva*. Carpels 10–20, straightish, with a short empty beak, separated within from the 1-seeded cell by a narrow projection, indehiscent or partly 2-valved. Radicle pointing downward. (Name drawn from Greek mythology.)

** Involucel 3-leaved.*

1. C. triangulàta (Leavenw.) Gray. Stellate-pubescent; stems nearly *erect*, 6 dm. high, from a fusiform root; *leaves triangular or halberd-shaped*, or the lowest rather heart-shaped, coarsely *crenate;* the upper incised or 3–5-cleft; flowers panicled, short-pediceled, purple; involucel as long as the 5-cleft 5-nerved calyx; carpels not rugose. — Dry prairies, Ind. to Minn., and southw.

2. C. involucràta (T. & G.) Gray. Hirsute or hispid, *procumbent; leaves rounded, 5–7-parted or -cleft, the segments incisely lobed;* peduncles elongated, 1-flowered; calyx 5-parted, the lanceolate 3–5-nerved sepals twice as long as the involucel; petals red or purplish; carpels indehiscent, rugose-reticulated. — Minn. to Tex., and westw.

** *Involucel none; calyx 5-parted; carpels strongly rugose.*

3. C. alcaeoìdes (Michx.) Gray. *Strigose-pubescent;* stems slender, 3 dm. high, erect from a perennial root; *lower leaves triangular-heart-shaped*, incised, the upper 5–7-parted, laciniate, the uppermost divided into linear segments; flowers rose-color or white, corymbose, on slender peduncles. — Barren oak lands, s. Ky. to Neb. and Tex.

4. C. digitàta Nutt. *Sparsely hirsute or glabrous*, erect; *leaves* few, *round-cordate*, 5–7-parted, the cauline commonly with linear divisions; peduncles subracemose, long, filiform; flowers red-purple to white. — Ill. to Kan. and Tex.

9. NAPAÈA [Clayt.] L. Glade Mallow

Calyx naked at the base, 5-toothed. Petals entire. Flowers dioecious; the staminate destitute of pistils, with 15–20 anthers; the fertile with a short column of usually antherless filaments. Styles 8–10, stigmatic along the inside. Fruit depressed-globular, separating into as many kidney-shaped 1-seeded beakless scarcely dehiscent carpels as styles. Radicle pointing downward. — Tall roughish perennial herb, with very large 9–11-parted lower leaves, the pointed lobes pinnatifid-cut, and small white panicled flowers. (Named from νάπη, a glade, or, poetically, a nymph of the glades.)

1. N. dioíca L. Stems nearly simple, 1.5–3 m. high. — Pa. to Va., w. to Ia. and Minn., rare. July.

10. KOSTELÉTZKYA Presl.

Pod depressed, with a single seed in each cell. Otherwise as *Hibiscus.* — Shrubs or, as in the case of our single species, perennial herbs, chiefly of tropical America. (Named for *V. F. Kosteletzky*, a Bohemian botanist.)

1. K. virgínica (L.) Presl. Roughish-hairy perennial, 6–12 dm. high; leaves halberd-shaped and heart-shaped, the lower 3-lobed; corolla 5 cm. wide, rose-color; column slender. — Marshes on the coast, N. Y., and southw. Aug.

11. HIBÍSCUS L. Rose Mallow

Calyx involucellate at the base by a row of numerous bractlets, 5-cleft. Column of stamens long, bearing anthers for much of its length. Styles united, stigmas 5, capitate. Fruit a 5-celled loculicidal pod. Seeds several or many in each cell. — Herbs or shrubs, usually with large and showy flowers. (An old Greek and Latin name of unknown meaning.)

a. Calyx herbaceous, not inflated about the capsule; perennials *b.*
  b. Shrub, with rhombic-ovate glabrous leaves . . . . . 1. *H. syriacus.*
  b. Herbs *c.*
    c. Stems and lower surfaces of leaves pubescent.
      Capsule smooth; leaves glabrous or glabrate above.
        Corolla rose-color; capsule depressed-globose, abruptly beaked . 2. *H. Moscheutos*
        Corolla white, with crimson center; capsule ovoid, gradually pointed . . . . . 3. *H. oculiroseus.*
      Capsule hirsute; leaves pubescent above.
        Leaves minutely stellate-canescent; capsule beaked . . . . 4. *H. incanus.*
        Leaves loosely and coarsely stellate-tomentose; capsule rounded or truncate at tip . . . . . 5. *H. lasiocarpos.*
    c. Stems and leaves glabrous . . . . . 6. *H. militaris.*
a. Calyx bladdery-inflated, soon becoming scarious; annual . . . . . 7. *H. Trionum.*

1. H. syrìacus L. (Shrubby Althaea of gardens.) *Tall shrub, smooth*; leaves rhombic- or wedge-ovate, pointed, cut-toothed or lobed; corolla usually rose-color. — Established in thickets and by roadsides, N. J., Pa., and southw. July–Sept. (Introd. from Asia.)

2. H. Moscheùtos L. (Swamp R.) Tall perennial (1–2.5 m. high); the *stem puberulent above; leaves* ovate, pointed, toothed, the lower and sometimes

the upper 3-lobed, *downy-whitened underneath, glabrous or slightly downy above;* calyx and bracts densely stellate-puberulent; calyx in anthesis 2–3 cm. long, its lobes ovate or ovate-oblong; *petals* 6–12 cm. long, *rose-color; capsule glabrous, subglobose, abruptly beaked.* — River-banks and fresh or brackish marshes, near the coast, e. Mass., southw.; also lake-shores and swamps (especially near salt springs) westw. to Ont. and Mo. July–Sept.

3. **H. oculiròseus** Britton. (CRIMSON-EYED or WHITE HIBISCUS.) Similar; calyx in anthesis 3–4 cm. long, its lobes ovate-lanceolate; *petals white, with a crimson blotch at base; capsule ovoid, gradually pointed.* — Marshes near the coast, N. J., and southw. July–Sept.

4. **H. incànus** Wendland. Resembling the preceding; *leaves* ovate to lanceolate, toothed, *rarely lobed;* calyx in anthesis 2.5–3 cm. long; petals white, yellowish, or pink, crimson-blotched at base; *capsule* ovoid, beaked, *closely stellate-tomentose and loosely hirsute.* — Swamps, Md., and southw.

5. **H. lasiocárpos** Cav. *Leaves* broadly to narrowly ovate, *soft-pubescent upon both surfaces, the upper surface bearing many simple* or subsimple *hairs; bractlets ciliate;* petals white or rose-color, crimson-blotched at base; capsule short-cylindric, subtruncate, densely villous-hirsute. — Marshes, Ga. to Tex., northw. in Miss. basin to Ky., Ind., Ill., and Mo. July–Sept.

6. **H. militàris** Cav. (HALBERD-LEAVED R.) *Smooth throughout;* lower leaves ovate-heart-shaped, toothed, 3-lobed; *upper leaves commonly halberd-form;* peduncles slender; corolla 5–7.5 cm. long, flesh-color, with purple base *fruiting calyx inflated; seeds hairy.* — River-banks, Pa. to Minn., and southw.

7. **H. TRIÒNUM** L. (FLOWER-OF-AN-HOUR.) A low rather *hairy annual;* upper leaves 3-parted, with lanceolate divisions, the middle one much the longest; fruiting *calyx inflated, membranaceous, 5-winged, with numerous dark ciliate nerves;* corolla sulphur-yellow, with a blackish eye, ephemeral. — Cultivated and waste ground, rather local. (Nat. from Eu.)

TERNSTROEMIÀCEAE (TEA OR CAMELLIA FAMILY)

Trees or shrubs, with alternate simple feather-veined leaves and no stipules, the regular flowers hypogynous and polyandrous, the sepals and petals both imbricated in aestivation, the stamens more or less united at the base with each other (monadelphous or 3–5-adelphous) and with the base of the petals. Anthers 2-celled, introrse. Fruit a woody 3–5-celled loculicidal pod. Seeds few, with little or no albumen. Embryo large, with broad cotyledons. — A family with showy flowers, the types of which are the well-known CAMELLIA and the more important TEA PLANT.

1. **Stewartia.** Stamens monadelphous. Ovules 2 in each cell, ascending.
2. **Gordonia.** Stamens 5-adelphous. Ovules 4–8 in each cell, pendulous.

1. STEWÀRTIA L.

Sepals 4, rarely 6, ovate or lanceolate. Petals 5, rarely 6, obovate, crenulate. Stamens monadelphous below. Pod 5-celled. Seeds 1 or 2 in each cell, crustaceous, anatropous, ascending. Radicle longer than the cotyledons. — Shrubs with membranaceous deciduous oblong-ovate serrulate leaves, soft-downy beneath, and large short-peduncled flowers solitary in their axils. (Named for *John Stuart*, — or as formerly often written *Stewart*, — Marquis of Bute.)

1. **S. Malachodéndron** L. Petals 5, white, 2.5 cm. long; sepals ovate; style 1; stigma 5-toothed; pod globular, blunt; seeds not margined. (*S. virginica* Cav.) — Woods, Va., and southw.

2. **S. pentágyna** L'Hér. Leaves larger, 1.3–1.5 dm. long; sepals acute; petals often 6; styles 5, distinct; pod angled, pointed; seeds wing-margined. — Mts. of Ky. and N. Car. to Ga.

2. GORDÒNIA Ellis. Loblolly Bay

Sepals 5, rounded, concave. Petals 5, obovate. Stamens 5-adelphous, one cluster adhering to the base of each petal. Style 1. Pod ovoid, 5-valved; the valves separating from the persistent axis; cells 2–8-seeded. Seeds pendulous; radicle short; cotyledons thin, longitudinally plaited. — Shrubs or small trees, with large and showy white flowers on axillary peduncles. (Dedicated by Dr. Garden to his "old master, *Dr. James Gordon* of Aberdeen," and by Ellis to a London nurseryman of the same name.)

1. **G. Lasiánthus** L. (Tan Bay.) Leaves coriaceous and persistent, lanceolate-oblong, narrowed at the base, minutely serrate, smooth and shining; petals 3–4 cm. long; pod pointed; seeds winged above. — Swamps near the coast, Va., and southw. May–July.

HYPERICÀCEAE (St. John's-wort Family)

Herbs or shrubs, with opposite entire dotted mostly sessile leaves and no stipules, regular hypogynous flowers, the petals mostly oblique and convolute in the bud, and many or few stamens sometimes collected in 3 or more clusters or bundles. Pod 1-celled with 2–5 parietal placentae, and as many styles, or 3–7-celled by the union of the placentae in the center; dehiscence mostly septicidal. Sepals 4 or 5, imbricated in the bud, herbaceous, persistent. Petals 4 or 5, mostly deciduous. Styles persistent, at first sometimes united. Seeds numerous, small, anatropous, with no albumen. — Plants usually smooth. Flowers solitary or cymose.

1. **Ascyrum**. Sepals 4, in 2 very unequal pairs. Petals 4. Stamens many, distinct.
2. **Hypericum**. Sepals 5. Petals 5. Stamens usually many and often in 3 or 5 clusters.

1. ÁSCYRUM L. St. Peter's-wort

Sepals 4; the two outer very broad and leaf-like; the inner much smaller. Petals 4, oblique, very deciduous, convolute in the bud. Stamens numerous; the filaments distinct and scarcely in clusters. Pod strictly 1-celled, 2–4-valved. — Low rather shrubby smooth pale green plants, with nearly solitary light yellow flowers. (Ancient Greek name for some plant probably of this family.)

1. **A. stáns** Michx. (St. Peter's-wort.) Stem suberect, 2-edged, 3–6 dm. high, stout; *leaves oval or oblong, somewhat clasping*, thickish; flowers showy; outer sepals round-cordate, inner lanceolate; *petals obovate;* styles 3 or 4. — Pine barrens, L. I. to Pa., and southwestw. July, Aug.

2. **A. hypericoìdes** L. (St. Andrew's Cross.) Low, much branched and decumbent; *leaves narrowly obovate-oblong, contracted at the base*, thin; *petals linear-oblong;* styles 2, very short; pod flat. (*A. Crux-Andreae* L. 1763, not 1753.) — Wet sand or rocky barrens, Nantucket I., Mass., to s. Ill., Neb., and southw. July–Sept. — Petals scarcely exceeding the outer sepals, approaching each other in pairs over them, in the form of a St. Andrew's cross.

2. HYPERÌCUM [Tourn.] L. St. John's-wort

Sepals 5, usually subequal. Petals 5, oblique, convolute in the bud (except in § 6). Stamens frequently united or clustered in 3–5 parcels; no interposed glands. Pod 1-celled or 3–5-celled. Seeds usually cylindrical. — Herbs or shrubs, with cymose yellow, flesh-colored, or purplish flowers. (An ancient Greek name of obscure meaning.)

a. Petals yellow (at most mottled or striped with red, purple, or black) *b.*
b. Styles 5; pods 5-celled.
Tall herb; flowers 4–6 cm. broad; pods 2–3 cm. long . . 1. *H. Ascyron.*
Slender shrub; flowers 1.5–3 cm. broad; pods 5–10 mm. long 8. *H. Kalmianum.*
b. Styles 3, rarely 4; pods 3(rarely 4)-celled *c.*
c. Stamens very numerous (more than 12) *d.*
d. Shrubs, 0.5–2 m. high.
Pods 1–1.5 cm. long . . . . . 6. *H. prolificum.*
Pods 5–8 mm. long . . . . . 7. *H. densiflorum.*
d. Herbs, at most slightly woody at base *e.*
e. Stamens in 3–5 clusters; petals marked with black dots or lines *f.*
f. Petals bearing black dots only on the margin.
Flowers and leaves few, the latter 1.5–3 cm. broad . 2. *H. graveolens.*
Flowers and leaves very numerous, the latter rarely 1 cm. broad . . . . . 3. *H. perforatum.*
f. Petals bearing several rows of black dots or lines.
Leaves rounded at tip; sepals blunt or acutish; pods 4–6 mm. long . . . . . 4. *H. punctatum.*
Leaves (at least the upper) narrowed to the tip; sepals acuminate; pods 6–8 mm. long . . . . . 5. *H. pseudomaculatum*
e. Stamens obscurely if at all clustered; petals without black dots *g.*
g. Stems herbaceous, from slender creeping freely stoloniferous bases.
Leaves and linear-lanceolate acute firm sepals with revolute margins . . . . . 10. *H. adpressum.*
Leaves and oblanceolate or obovate thin foliaceous sepals plane . . . . . 14. *H. ellipticum.*
g. Stems woody at base, or if herbaceous without slender stolons *h.*
h. Stems freely branching, woody at base; cymes leafy-bracted; styles united below; stigmas elongate *i.*
i. Capsule thick-ovoid to subglobose, somewhat 3-angled, essentially 1-celled.
Sepals 6–13 mm. long; corolla 1.5–2 cm. broad.
Sepals 6–10 mm. long, 2–5 mm. broad . . 11. *H. dolabriforme.*
Sepals variable, the larger 1–1.3 cm. long, 6–8 mm. wide . . . . . 12. *H. Bissellii.*
Sepals 3–5 mm. long; corolla 1–1.5 cm. broad . 13. *H. cistifolium.*
i. Capsule conic-subulate, distinctly 3-celled . . 9. *H. galioides.*
h. Stems simple below the loosely forking essentially naked inflorescence, herbaceous; styles distinct; stigmas capitate . . . . . 15. *H. virgatum.*
c. Stamens 5–12 *j.*
j. Stem simple or loosely branched; leaves linear to ovate, spreading *k.*
k. Bracts of the inflorescence foliaceous, resembling reduced stem-leaves . . . . . 16. *H. boreale.*
k. Ultimate bracts of the inflorescence setaceous to linear-subulate.
Leaves orbicular, ovate-deltoid, or rounded-oblong, clasping.
Leaves ovate-oblong or short-elliptic, rounded at tip; pod short-ellipsoid . . . . . 17. *H. mutilum.*
Leaves ovate-deltoid, acutish or blunt; pod slender-conical . . . . . 18. *H. gymnanthum.*
Leaves lanceolate to linear, merely sessile (if clasping with lance-attenuate outline).
Leaves lanceolate, chiefly 5–7-nerved at base . . 19. *H. majus.*
Leaves linear, 1–3-nerved . . . . . 20. *H. canadense.*
j. Stems fastigiately branched; leaves scale-like or linear-subulate, strongly ascending.
Leaves 6–20 mm. long; pods ovoid, slightly exceeding the calyx . . . . . 21. *H. Drummondii.*
Leaves shorter, scale-like; pods lance-subulate, much exceeding the calyx . . . . . 22. *H. gentianoides.*
a. Petals flesh-color or purplish.
Leaves sessile or clasping . . . . . 23. *H. virginicum.*
Leaves narrowed to distinct petioles . . . . . 24. *H. petiolatum.*

§ 1. RÓSCYNA (Spach) Endl. *Stamens very numerous, 5-adelphous; styles 5, united below, the stigmas capitate; pod 5-celled, the placentae turned far back into the cells; perennial herb; flowers very large.*

1. **H. Ascyron** L. (GREAT S.) Stems 5–15 dm. high; branches 2–4-angled; leaves 4–9 cm. long, ovate-oblong, partly clasping; petals narrowly obovate, 2.5

cm. long, not deciduous until after they wither; pod 2–3 cm. long, conical. — Banks of rivers, w. Que. to Man., s. to Pa., Ill., Mo., and Kan. July, Aug.

§ 2. EUHYPERÌCUM Boiss. *Stamens very many, in 3 or 5 clusters; styles 3, separate and usually diverging; pod 3-celled; calyx erect; petals and anthers with black dots; perennials.*

2. **H. gravèolens** Buckley. (MOUNTAIN S.) *Leaves* elliptic-oblong, 5–7 *cm. long;* flowers large, 2–5 cm. broad; petals sparingly dotted on the margin; pod rather large, 7–10 mm. long. — Summits of the higher mts. of s. w. Va. and N. C.

3. **H.** PERFORÀTUM L. (COMMON S.) Stem much branched and corymbed, somewhat 2-edged, producing runners from the base; leaves elliptic- or linear-oblong, with pellucid dots; *petals deep yellow, black-dotted along the margin,* twice the length of the *lanceolate acute sepals; flowers numerous, in open leafy cymes.* — Fields, etc. June–Sept. — A pernicious weed, difficult to extirpate; juice very acrid. (Nat. from Eu.)

4. **H. punctàtum** Lam. Conspicuously marked with both black and pellucid dots; stem terete, sparingly branched; *leaves oblong, rounded at tip,* the base either subclasping, sessile, or subpetiolate; *flowers crowded; petals pale yellow, marked with dark lines and dots, about twice as long as the oblong bluntish or acute sepals; pods 4–6 mm. long.* (*H. maculatum* Walt., not Crantz; *H. corymbosum* Muhl.) — Damp places, e. Que. to Ont., and southw. July–Sept.

5. **H. pseudomaculàtum** Bush. Similar; *leaves* oblong-lanceolate to ovate, at least the *upper narrowed to the tip; petals three or four times as long as the acuminate sepals; pods 6–8 mm. long.* — Woods and prairies, Ill. and Mo. to Tex. and Ga.

§ 3. MYRIÁNDRA (Spach) Endl. *Stamens very numerous, obscurely if at all clustered; styles more or less united, the stigmas elongate; pod more or less 3–5-celled; placentae central or parietal.*

* *Bushy shrubs, 5–20 dm. high, leafy to the top.*

← *Styles 3; pod completely 3-celled.*

6. **H. prolíficum** L. (SHRUBBY S.) Branchlets 2-edged; leaves narrowly oblong, 3–7 cm. long, mostly obtuse, narrowed at the base; flowers numerous, in simple or compound clusters; *pods* subulate to ovoid, 1–1.5 *cm. long.* — N. J. to s. Ont., Minn., and southw. July–Sept. — Varies greatly in size, etc.

7. **H. densiflòrum** Pursh. Exceedingly branched above, 0.5–2 m. high, the branches slender and crowded with smaller leaves; flowers smaller (1.2–1.7 cm. in diameter) and more numerous, in crowded compound cymes; *pod 5–8 mm. long.* — Pine barrens of N. J. to glades of Ky., Ark., and southw.

← ← *Styles 5; pod completely 5-celled.*

8. **H. Kalmiànum** L. (KALM'S S.) Branches 4-angled; branchlets 2-edged; leaves crowded, glaucous, linear to oblanceolate, 3–4.5 cm. long; flowers few in a cluster, 3–5 cm. wide; pods ovoid. — Rocky or sandy soil, Pontiac Co., Que., to Niagara Falls, and along the Great Lakes to w. Ont., Mich., and Ill.

** *Perennials, herbaceous or a little woody at base; pod incompletely 3–4-celled.*

9. **H. galioìdes** Lam. Slender, branching, *woody below; leaves linear-oblanceolate,* narrowed downward, 1.5–7 cm. long, mostly acute; flowers small in terminal and axillary cymes; sepals very narrow, 3–5 mm. long; pod 5–6 mm. long, ovoid. — Del. to Ga. and e. Tenn.

10. **H. adpréssum** Bart. Stem simple, 3–6 dm. high, *herbaceous, from a slender creeping freely stoloniferous base,* obscurely 4-angled below and 2-edged above; *leaves ascending, lanceolate* or linear-oblong, often acute, thin, 4–5 cm. long; cyme terminal, leafy at the base, few-flowered; sepals linear-lanceolate; petals bright yellow, 7–10 mm. long; pods ovoid. — Moist sandy shores, e. Mass. to Pa., and southw., chiefly near the coast. July, Aug. Var. SPONGIÒSUM Robinson. Taller (7 dm. or more high), *the stem spongy-thickened at base; leaves oblong.* — Marshy borders of ponds, s. e. Mass.

§ 4. BRATHÝDIUM (Spach) Endl. *Similar to* § 3; *pod* 1-*celled, with* 3 *parietal placentae.*

11. **H. dolabrifórme** Vent. *Stems* branched from the decumbent base, *woody below*, 1.5–5 dm. high, terete; *leaves linear-lanceolate*, widely spreading, veinless; cyme leafy, few-flowered; *sepals oblong or ovate-lanceolate*, about the length of the very oblique petals (1–1.2 cm. long); *pods ovoid-conical*, the walls very thick and hard. — Dry hills and rocks, barrens of Ky. and Tenn. June–Aug.

12. **H. Bisséllii** Robinson. *Stems subsimple or with short* ascending *branches*, somewhat woody below, 4–5 dm. high; *leaves* narrowly *oblong, obtusish*, ascending, 2.5–3.5 cm. long, 3–5 mm. wide, 1-nerved, deep green above, pale beneath; cyme about 20-flowered, leafy-bracted, the bracts ovate; flowers 1.5 cm. broad; *sepals very unequal, the largest broad-ovate*, 1.3 *cm. long*, 8 *mm. wide*, subcordate, acuminate; petals oblong-obovate, oblique, with a mucro on one side near the tip. — Southington, Ct. (*Bissell*).

13. **H. cistifòlium** Lam. Stems mostly simple, herbaceous, 3–5 dm. high, with a *somewhat woody base*, angled with 4 very narrow salient lines; leaves narrowly oblong to nearly linear, 3–7 cm. long, sessile with a somewhat clasping base; the cyme naked, compound, usually many-flowered; *sepals ovate; pods depressed-globular or ovoid-conical;* seeds large, oblong, very rough-pitted. (*H. sphaerocarpum* Michx.) — Rocky river-banks, s. w. O. to Ia., and southw. July–Sept. — Flowers small.

14. **H. ellípticum** Hook. Stem simple, herbaceous, 2–5 dm. high, obscurely 4-angled, from a *slender creeping stoloniferous base; leaves spreading, elliptical-oblong*, obtuse, usually narrower toward the subclasping base, thin; cyme nearly naked, rather few-flowered; petals bright yellow, 6–10 mm. long; *sepals oblong; pods ovoid, very obtuse;* seeds minutely striate. — Wet places, N. B. to Man., s. to Pa., Mich., Wisc., and Minn. July, Aug. — Aberrant plants often have small red or purplish petals.

§ 5. BRÀTHYS (Mutis) Choisy. *Stamens distinct or in* 3 *clusters; pod* 1-*celled, with* 3 *strictly parietal placentae; styles short, distinct, with capitate stigmas; petals small, oblong or linear; sepals narrow, erect; slender plants, with* 4-*angular branches, flowering all summer.*

* *Stamens* ∞.

15. **H. virgàtum** Lam. Stem slender, strict, simple, sharply 4-angled, herbaceous, 3–6 dm. high; leaves ascending, opaque, ovate or oblong-lanceolate, acute, 1.5–2.7 cm. long, closely sessile by a broad base; *inflorescence compound, naked*, the *scattered flowers racemose on its ascending branches;* petals copper-yellow, 8–10 mm. long; *sepals herbaceous, erect*, inclosing the ovoid pod. (*H. angulosum* Michx.) — Wet pine barrens, Pa. to Ga., westw. to O., Ky., and (?) Ill. July–Sept.

Var. **ovalifòlium** Britton. Leaves oval, erect, 1–1.8 cm. long, more than half as broad. — Pine barrens, N. J. and southw.

** *Stamens* 5–12.

← *Stem simple or loosely branched; leaves linear to ovate, spreading.*

16. **H. boreàle** (Britton) Bicknell. Perennial; *the stems decumbent and leafy-bracted at base*, slender, 5–30 cm. high (rarely submersed and very elongate); *leaves elliptic*, rounded at tip, *sessile*, 3–20 mm. long, 3–5-nerved; cymes leafy-bracted, *all the bracts foliaceous and broad;* pedicels short; sepals linear, blunt, shorter than the *rounded short-ellipsoid pod* (3–5 *mm. long*). (*H. canadense*, var. *minimum* Man. ed. 6.) — Bogs, margins of ponds, etc., Nfd. to w. Ont., s. to N. J., Pa., O., and Ind. July, Aug.

17. **H. mùtilum** L. Stem flaccid, widely branching, annual, or perennial with leafy-bracted decumbent bases; *leaves ovate to narrowly oblong, obtuse, partly clasping, 5-nerved;* cyme (in well developed plants) diffuse, somewhat leafy-bracted, *the ultimate bracts setaceous;* flowers 4 mm. broad; sepals linear-

lanceolate, acute; *pods* 2.5–3.5 *mm. long, short-ellipsoid, rounded at apex.* — Low grounds, common. July, Aug.

18. **H. gymnánthum** Engelm. & Gray. Almost simple, with strict stem and branches, 3–9 dm. high; *leaves clasping, heart-shaped*, acute or obtuse; cyme naked, the floral leaves reduced to small awl-shaped bracts; pods slender-conical, pointed, 4–5 mm. long, slightly exceeding the lance-acuminate sepals. — Wet sandy barrens, N. J. and e. Pa. to Fla. and Tex.; northw. in Miss. basin to Mo., Ill., Ind., and O.; reported also from Minn.

19. **H. màjus** (Gray) Britton. Annual, or perennial by short leafy offshoots; stems solitary or tufted, erect, rather stout, 1–7 dm. high; *leaves chiefly 5–7-nerved at the rounded or subcordate* sessile or clasping *base, lanceolate*, the upper acute or bluntish, 1.5–4.5 cm. long, 3.5–13 mm. broad; cymes essentially naked, the bracts slender; *sepals lance-attenuate*, 5–7 mm. long, *nearly equaling the* conic-ellipsoid bluntish *pod.* (*H. canadense*, var. Gray.) — Wet or dry open soil, e. Que. to Man., s. to L. I., N. J., Pa., Ill., Ia., and S. Dak.; also e. Wash. July, Aug.

20. **H. canadénse** L. Annual, or perennial by short leafy offshoots; stems slender, 1–4 dm. high; *leaves* 1–3-*nerved, linear to linear-oblanceolate, rounded at tip, narrowed to the* sessile or subpetiolar *base*, 1–4 cm. long, 1–6 mm. broad; cymes naked except for the linear-setaceous bracts; *sepals* linear-lanceolate, blunt or acutish, 2.5–5 mm. long, *much shorter than the slender-conical* red or purplish *pod.* — Wet or dry, chiefly exsiccated places, Nfd. to Man., s. to Ga., Ky., Wisc., and Minn. July–Sept.

— — *Stems fastigiately branched; leaves linear or bract-like, ascending or appressed.*

21. **H. Drummóndii** (Grev. & Hook.) T. & G. Stem and the mostly alternate bushy branches rigid, erect, 1.5–8 dm. high; *leaves linear-subulate*, nearly erect, 1-*nerved*, 6–20 mm. long; *flowers scattered* along the upper part of the leafy branches, *short-pediceled; pods ovoid, not longer than the calyx.* — Dry soil, Ashtabula Co., O. (*Louth*), Ill., Ia., Kan., and southw.

22. **H. gentianoìdes** (L.) B S P. (Orange Grass, Pineweed.) Stem and bushy branches thread-like, wiry, 1–3 dm. high; *leaves minute awl-shaped scales, appressed; flowers minute, mostly sessile* and scattered along the erect branches; *pods ovoid-lanceolate*, acute, *much longer than the calyx.* (*Sarothra* L.; *H. nudicaule* Walt.) — Sandy or rocky soil, Me. to Fla. and Tex., chiefly e. of the Alleghenies; and from s. w. Ont. to Ill., and southw.

§ 6. ELÒDEA (Juss.) Choisy. *Petals imbricated in bud, flesh-colored or purplish. Stamens mostly* 9, *in* 3 *bundles. Styles* 3, *distinct.* — Elodea Juss.; Elodes Man. ed. 6, not Adans.

23. **H. virgínicum** L. (Marsh S.) Stoloniferous; *leaves closely sessile or clasping by a broad base*, oblong or ovate, very obtuse; filaments united below the middle. (*Triadenum* Raf.; *Elodea campanulata* Pursh.) — Common in swamps. July, Aug. — The entire plant frequently has a pink or crimson tone.

24. **H. petiolàtum** Walt. (Marsh S.) Taller, more branching; *leaves tapering into a short petiole, oblong;* filaments united beyond the middle. (*Triadenum* Britton.) — Cypress swamps, etc., N. J. to Mo., and southw.

ELATINÀCEAE (Waterwort Family)

Little marsh annuals, with membranaceous stipules between the opposite dotless leaves, minute axillary flowers like those of the Chickweeds, *but the pod* 2–5-*celled, and the seeds as in* St. John's-wort.

1. **Elatine.** Flowers 2–4-merous. Capsule globose. Glabrous, growing in or near water.
2. **Bergia.** Flowers 5-merous. Capsule ovoid. Plant pubescent, terrestrial.

1. ELATÌNE L. Waterwort

Sepals 2–4, obtuse. Petals 2–4, hypogynous. Stamens as many, rarely twice as many. Styles, or sessile capitate stigmas, 2–4. Pod membranaceous, 2–4-celled, several-many-seeded, 2–4-valved; the partitions left attached to the axis, or evanescent. — Dwarf plants, often rooting at the nodes. (A Greek name for an obscure herb.)

1. E. americàna (Pursh) Arn. Tufted, 1–2.5 cm. high, creeping; *leaves obovate*, obtuse, 2–6 mm. long; flowers sessile, rarely opening in the aquatic form; sepals, petals, stamens, and stigmas 2, rarely 3; *seeds* 5 or 6 in each cell, rising from the base, relatively large, *marked by* 9 or 10 *longitudinal lines and* 20–30 *crossbars.* — Margin of ponds, etc., e. Que. to B. C., s. to Va., Mo., and in the Rocky Mts. to Mex.

2. E. triándra Schkuhr. *Leaves oblanceolate or nearly lanceolate;* petals and stamens commonly 3; seeds more slender, covering the axis. — Ponds, Ill. to Neb., and westw. (Eu.)

3. E. brachyspérma Gray. *Leaves oblong* or oval, with narrowed base; *flowers* mostly *dimerous;* seeds short-oblong, *with* 6 or 7 *longitudinal lines and* 10–12 *crossbars.* — Ill. and southwestw.

2. BÉRGIA L.

Sepals 5, acuminate, with thickened midnerve and scarious margins. Petals 5. Stamens 5 or 10. Pod of firm texture. — Diffuse or ascending plants, chiefly tropical. (Named for *P. J. Bergius,* a Swedish botanist of the 18th century.)

1. B. texàna (Hook.) Seubert. Branched from the base, branches 1–4 dm. long; flowers scarcely peduncled in the axils of the lance-oblong serrulate leaves. — Swamps and wet banks, s. Ill. to Kan., southw. and westw.

CISTÀCEAE (Rockrose Family)

Low shrubs or herbs, with regular flowers, distinct and hypogynous mostly indefinite stamens, a persistent calyx, a 1-*celled* 3–5-*valved capsule with as many parietal placentae borne on the middle of the valves, and orthotropous albuminous seeds.* Sepals 5; the two external much smaller, bract-like, or sometimes wanting; the 3 others a little twisted in the bud. Petals 3 or 5, convolute in the opposite direction from the calyx in the bud. Anthers short, innate, on slender filaments. Style single or none. Ovules few or many, on slender stalks, with the orifice at the apex. Embryo long and slender, straightish or curved, in mealy albumen; cotyledons narrow. Leaves simple and mostly entire, the lower usually opposite, and the upper alternate. — Inert plants.

1. **Helianthemum**. Petals 5, crumpled in the bud, fugacious (or none). Stigma nearly sessile. Stamens and ovules numerous in the petal-bearing flowers.
2. **Hudsonia**. Petals 5, fugacious. Stamens 9–30. Style long and slender. Pod strictly 1-celled, 2–6-seeded. Heath-like.
3. **Lechea**. Petals 3, flat in the bud, withering-persistent. Stamens 3–12. Style none. Pod partly 3-celled, the imperfect partitions bearing broad 2-seeded placentae.

1. HELIÁNTHEMUM [Tourn.] Mill. Rockrose

Capsule strictly 1-celled. Embryo curved in the form of a hook or ring. Flowers in most N. American species of two sorts, viz., *primary* or earlier ones, with large yellow petals, indefinitely numerous stamens, and many-seeded pods; and *secondary*, or later ones, which are much smaller and in clusters, with small petals or none, 3–10 stamens, and much smaller 3–few-seeded pods.

— The large flowers open only once, in sunshine, and cast their petals by the next day. (Name from ἥλιος, *the sun*, and ἄνθεμον, *flower*.)

1. H. canadénse (L.?) Michx. (Frostweed.) Erect, hoary-pubescent, 3–5 dm. high, at first simple; leaves lance-oblong, pale beneath; *large flowers solitary*, 2.5 cm. broad, *soon surpassed by lateral branches*, their pods 6 mm. long; the *small flowers* clustered *on short 1–4-flowered branchlets*, their pods light brown, unequal, those of the terminal flowers commonly larger, 3–4 *mm. in diameter*. — Sandy or gravelly dry soil, Me. to Mich., N. C., and Miss. June–Aug. — Late in autumn crystals of ice shoot from the cracked bark at the base of this and the next species, whence the popular name. A dwarf and rather more cespitose plant with crowded stems only 1–2 dm. high, common on sterile shores and sandy hills near the sea, from e. Mass. southw. (*H. propinquum* Bicknell) appears to be only a stunted form of this species.

2. H. màjus BSP. (Frostweed.) Similar in habit and more canescent; primary flowers clustered at the summit of the stem, not surpassed by branches; petals slightly paler yellow than in the preceding; *secondary flowers* very small, *numerous, closely clustered along slender branches*, their *pods dark brown*, 2 *mm. in diameter*. — Similar situations, N. S. to Minn., Col., and southw. — This is *H. majus* BSP., at least in part, and of recent auth. It seems probable, however, that *Lechea major* L. represented rather the preceding species. Until the Linnean types both of *Cistus canadensis* and of *Lechea major* can be definitely identified, it seems best to allow the current interpretation of the names under *Helianthemum* to stand as above.

3. H. corymbòsum Michx. *Flowers all corymbosely clustered at the summit* of the stem or branches, the petal-bearing ones at length on slender stalks; calyx woolly. — Pine barrens, N. J., and southw. along the coast.

2. HUDSÒNIA L.

Petals much larger than the calyx. Style long and slender; stigma minute. Pod terete, inclosed in the calyx, strictly 1-celled, with 1 or 2 seeds attached near the base of each nerve-like placenta. Embryo coiled into the form of a closed hook. — Bushy heath-like little shrubs, covered with the small awl-shaped or scale-like alternate persistent downy leaves, producing numerous small but showy bright yellow flowers crowded along the upper part of the branches. (Named in honor of *William Hudson*, an early English botanist.)

1. H. ericoìdes L. Downy but greenish; *leaves* slender, awl-shaped, *loose; flowers on slender naked stalks;* ovary hairy. — Dry sandy soil near the coast, Nfd. to Va. May.

2. H. tomentòsa Nutt. Hoary with down; *leaves* oval or narrowly oblong, 2 mm. long, *close-pressed and imbricated; flowers sessile* or nearly so. — Sandy shores, dunes, etc., N. B. to Va., and along the Great Lakes to Minn.; rarely on banks of streams inland. May, June. Passing into var. intermèdia Peck. Leaves tending to be more awl-shaped; flowers obviously peduncled. — Sand hills, etc., e. Que. to Mackenzie, s. to e. N. B., Saco Valley, Me. and N. H., shores of L. Champlain, Vt., and the Great L. region.

3. LÈCHEA [Kalm] L. Pinweed

Stigmas 3, plumose. Pod globular or obovoid. Embryo straightish. — Slender erect paniculately branched perennial herbs, developing leafy shoots from the base. Flowers very small, greenish or purplish, in summer. (Named in honor of *Johan Leche*, a Swedish botanist.)

Leaves of the basal shoots elliptical or oblong.
  Pubescence of the stem spreading; panicle of small dense corymbose clusters . . . . . 1. *L. villosa.*
  Pubescence of the stem appressed; panicle more open.
    Outer sepals exceeding the inner . . . . . 2. *L. minor.*
    Outer sepals shorter than the others.

Fruiting calyx narrow, obovoid or pyriform; leaves of the basal shoots green . . . . . 8. *L. racemulosa.*
Fruiting calyx subglobose; leaves of the basal shoots hoary-pubescent . 5. *L. maritima.*
Leaves of the basal shoots narrowly lanceolate to linear.
Inner sepals 1-nerved, usually exceeded by the narrow outer ones . . . 6. *L. tenuifolia.*
Inner sepals 3-nerved, equaling or longer than the outer.
Canescent-pubescent.
Panicle strict, fastigiate, spire-like . . . . . 4. *L. stricta.*
Panicle broadly pyramidal . . . . . 5. *L. maritima.*
Green, more sparingly pubescent.
Fruiting calyx depressed-globose, 2.5–3 mm. broad . . . . . 3. *L. intermedia.*
Fruiting calyx obovoid, 1.5–2 mm. broad . . . . . 7. *L. Leggettii.*

* *Pubescence villous, spreading; leaves oblong; flowers very short-pediceled, in cymulose clusters.*

1. **L. villòsa** Ell. Stem upright, 3–7 dm. high, stout, simple, very leafy, producing slender prostrate branches from the base; leaves elliptical, mucronate-pointed, alternate and opposite or sometimes whorled; flowers densely crowded; pedicels shorter than the very small depressed-globose pod; sepals narrower than the valves of the capsule. (*L. major* Michx., not L.) — Sterile grounds, s. N. H. and s. Vt. to Fla.; also from s. Ont. and O. to Neb., and southw., common.

* * *Pubescence appressed; flowers open-paniculate.*

← *Leaves comparatively short, broad, and thin.*

2. **L. mìnor** L. Erect, about 3–6 dm. high; stem-leaves oval or oblong, 6–12 mm. long, commonly somewhat hairy, some whorled or opposite, those of the rather crowded panicles more linear; pod obovoid-globose. (*L. thymifolia* Michx.) — Dry soil, s. N. H. and s. Vt. to Fla. and Miss.; also s. Ont. and Mich.

← ← *Leaves firmer, narrow, the cauline linear to slender-subulate; panicles more naked and racemiform.*

→ *Fruiting calyx globular or broadly ovoid; pod nearly globose.*

3. **L. intermèdia** Leggett. Rather strict, 3 dm. high or more, usually *glabrate in age;* leaves of the basal shoots lanceolate, 3–6 mm. long, the cauline linear-lanceolate, 1–2.5 cm. long; panicle elongated, subcylindrical; *pod* large for the genus, *depressed-globose, 2–3 mm. in diameter.* (*L. minor* Man. ed. 6, in part.) — Dry soil, N. B. to e. N. Y. and Pa.; also s. Ont., Mich., and Wisc. Passing to

Var. **juniperìna** (Bicknell) Robinson. Branches short, fastigiately appressed; leaves erect, mostly appressed; pedicels short; leafy panicle spire-like. (*L. juniperina* Bicknell.) — Sandy soil, coast of s. Me., extending inland in the Androscoggin and Saco valleys to n. N. H.

4. **L. stricta** Leggett. *Virgate, fastigiately branched, very pale with fine appressed pubescence; inflorescence* close, *spire-like; pod* 1.7–2 *mm. in diameter.* — Borders of woods, etc., w. N. Y. to Ill. and Minn.

5. **L. marìtima** Leggett. Stout and rigid for the genus, 3–5 dm. high, pale; *leaves of the basal shoots lance-oblong,* hoary-pubescent, thickish, those of the stem and inflorescence linear or nearly so; *panicle broadly pyramidal;* calyx canescent-pubescent, globular in fruit; pedicels 0.5–1.5 mm. long. (*L. minor,* var. Gray.) — Sandy soil near the coast, from the mouth of the Kennebec., Me., to Ga. Passing inland to

Var. **intèrior** Robinson. Lower (2–3 dm. high), more slender, thinner-leaved and greener; pedicels filiform, 2–3 mm. long. — Open sandy places, s. N. H. to w. Mass. — Distinguished from *L. intermedia* by its pyramidal inflorescence and slightly smaller pods.

6. **L. tenuifòlia** Michx. Low, slender and diffuse, minutely pubescent or glabrous; *leaves* all small and *very narrow; flowers* mostly on very short pedicels, *diffusely racemose-paniculate;* one or both the narrow *outer sepals exceeding the inner ones,* the latter strictly 1-nerved; pod subglobose. — Dry sterile soil, s. N. H. to Wis., Neb., and southw.

↔ ↔ *Smaller-flowered; fruiting calyx narrower, ellipsoidal or pyriform.*

7. L. Leggéttii Britton & Hollick. Slender, 3–5 dm. high, glabrate; all *leaves lance-linear to narrowly linear*, green; panicle open, diffuse, ovoid-pyramidal, the flowers often inclining to be secund-racemose; fruiting *calyx obovoid or pyriform.* (*L. moniliformis* Bicknell.) — Nantucket to Ind. and southw.

8. L. racemulòsa Lam. Erect, soft-pubescent when young, soon nearly glabrous; leaves of radical shoots oblong, the cauline oblong-linear, 1–2 cm. long; inflorescence loose and diffuse; fruiting *calyx* glabrous, *ellipsoidal.* — Dry and rocky soil, L. I. to Ky. and southw.

VIOLÀCEAE (Violet Family)

Herbs, with a somewhat irregular 1-spurred or gibbous corolla of 5 petals, 5 hypogynous stamens with adnate introrse anthers conniving over the pistil, and a 1-celled 3-valved pod with 3 parietal placentae. Sepals 5, persistent. Petals imbricated in the bud. Stamens with their short and broad filaments continued beyond the anther-cells, and often coherent with each other. Style usually club-shaped, with the simple stigma turned to one side. Valves of the capsule bearing the several-seeded placentae on their middle; after opening, each valve as it dries folding together lengthwise firmly, projecting the seeds. Seeds anatropous, with a hard seed-coat, and a large straight embryo nearly as long as the albumen; cotyledons flat. — Leaves alternate, with stipules. Flowers axillary, nodding.

1. **Hybanthus.** Sepals not auricled. Petals (in ours) equal in length. Stamens united into a sheath.
2. **Viola.** Sepals auricled. Lower petal spurred. Stamens distinct, the two lower spurred.

1. HYBÁNTHUS Jacq. Green Violet

Petals nearly equal (or in extralimital species very unequal) in length, but the lower one larger and gibbous or saccate at the base, more notched than the others at the apex. Stamens (in ours) completely united into a sheath inclosing the ovary, and bearing a broad gland on the lower side. Style hooked at the summit. — Perennials, with stems leafy to the top, and 1–3 small greenish-white flowers on short recurved axillary pedicels. (Name from ὑβός, *hump-backed*, and ἄνθος, *flower*, from the dorsal gibbosity.) Calceolaria Loefl. Solea Spreng. Ionidium Vent. Cubelium Raf.

1. H. cóncolor (Forster) Spreng. Plant 4–8 dm. high; leaves oblong, pointed at both ends, entire; pod 2 cm. long. (*Solea* Gingins; *Cubelium* Raf.) — Rich woods, moist ravines, etc., N. Y. to Mich., Kan., and southw. Fl. Apr.–June; fr. July.

2. VÌOLA [Tourn.] L. Violet. Heart's-ease

Revised by E. Brainerd

Petals somewhat unequal, the lower one spurred at the base. Stamens closely surrounding the ovary, often slightly cohering with each other; the two lower bearing spurs which project into the spur of the corolla. Besides these conspicuous blossoms, which appear in spring, others are produced later, on shorter peduncles or on runners, often concealed under the leaves; these never open nor develop petals, but are fertilized in the bud and are far more fruitful than the ordinary blossoms. — The closely allied species of the same section, when growing together, often hybridize with each other, producing forms that are confusing to the student not familiar with the specific types. The hybrids

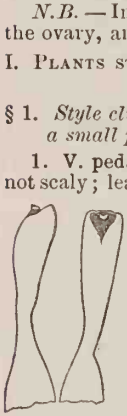
commonly display characters more or less intermediate between those of the parents, and show marked vegetative vigor but greatly impaired fertility. (The ancient Latin name of the genus.)

N.B. — In this genus the figures are of the stigmas, styles, and upper part of the ovary, and are on a scale of 5.

I. PLANTS STEMLESS, the leaves and scapes directly from a rootstock or from runners. (For Group II. see p. 585.)

§ 1. *Style club-shaped, beakless, obliquely concave at the summit; stigma within a small protuberance near the center of the cavity* (Fig. 806).

1. V. pedàta L. (BIRD-FOOT V.) Nearly glabrous; rootstock short, erect, not scaly; leaves 3-divided, the lateral divisions 3–5-parted or -cleft, the segments all linear or narrowly spatulate, often 2–3-toothed or cut near the apex; the leaves of early spring or of autumn often less dissected; flowers 2–3 cm. broad; the upper petals dark violet, the others pale to deep lilac-purple, all beardless; the orange tips of the stamens large and conspicuous at the center of the flower; capsules green, glabrous; seeds copper-colored; apetalous flowers wanting, but petaliferous flowers often produced in late summer and autumn. (Var. *bicolor* Pursh.) — Open sunny slopes in sandy soil, s. N. E. (where rare) to Md. Var. LINEARÍLOBA DC. All the petals of the same lilac-purple color. (*V. pedata* Man. ed. 6, not L.) — Locally abundant, e. Mass. to Minn., and southw. FIG. 806.



806. V. pedata, v. lineariloba.

§ 2. *Style dilated upward in a vertical plane, capitate, with a conical beak on the lower side; stigma within the tip of the beak* (Fig. 807).

a. Rootstock fleshy and thickened, without runners; petals violet-blue to purple, the lateral bearded (BLUE VIOLETS) *b.*
  b. Leaves heart-shaped, the margins merely crenate-serrate, or in nos. 8–10 some leaves lobed but the cleistogamous flowers on prostrate peduncles *c.*
    c. Plants essentially glabrous.
      Beard of lateral petals strongly knobbed; cleistogamous flowers long and slender . . . . . 2. *V. cucullata.*
      Beard of lateral petals not strongly knobbed; cleistogamous flowers ovoid or ovoid-acuminate.
        Cleistogamous flowers mostly on ascending peduncles; capsules 5–10 mm. long.
          Leaves and sepals obtuse; capsules green . . . . . 3. *V. nephrophylla.*
          Leaves and sepals acute; cleistogamous capsules usually purplish . . . . . 4. *V. affinis.*
        Cleistogamous flowers mostly on short prostrate peduncles; capsules 10–15 mm. long.
          Leaves all undivided.
            Vernal leaves purplish beneath; plants of sandy or dry soil 5. *V. latiuscula.*
            Vernal leaves green beneath; plants of moist soil.
              Leaves narrow, gradually attenuated; flowers pale violet . . . . . 6. *V. missouriensis.*
              Leaves broad, merely acute or abruptly pointed; flowers deep violet . . . . . 7. *V. papilionacea.*
          Leaves palmately lobed or parted . . . . . 8. *V. Stoneana.*
    c. Plants more or less pubescent *d.*
      d. Leaves for the most part palmately 5–9-lobed . . . . . 9. *V. palmata.*
      d. Some leaves hastately 3–5-lobed . . . . . 10. *V. triloba.*
      d. Leaves all undivided *e.*
        e. Spurred petal glabrous or bearing only scattered hairs; capsules 8–12 mm. long . . . . . 11. *V. sororia.*
        e. Spurred petal villous; capsules 5–8 mm. long.
          Pubescent only on upper surface of leaves . . . . . 12. *V. hirsutula.*
          Pubescent on petioles and lower surface of leaves.
            Sepals and their auricles ciliolate . . . . . 13. *V. septentrionalis.*
            Sepals and their auricles not ciliolate . . . . . 14. *V. novae-angliae.*
  b. Leaves not heart-shaped, usually sharply dentate toward the base or lobed; cleistogamous flowers sagittate, on erect peduncles; capsules green *f.*
    f. Spurred petal villous *g.*
      g. Leaves ovate-oblong, pubescent, short-petioled . . . . . 15. *V. fimbriatula.*
      g. Leaves lanceolate, usually glabrous, long-petioled; basal lobes often dilated and incised . . . . . 16. *V. sagittata.*

g. Leaves deltoid, glabrous, sharply dentate below the middle . 17. *V. emarginata.*
g. Leaves parted into narrow lobes; species of the Atlantic coast 18. *V. Brittoniana.*
g. Leaves ovate-deltoid, the margins closely pectinate or sharply dentate . . . . . 19. *V. pectinata.*
g. Leaves parted into many linear segments, or sometimes only cleft; species of the Middle West . . . . . 20. *V. pedatifida.*
f. Spurred petal glabrous, narrow . . . . . 21. *V. viarum.*
a. Rootstock long and filiform, producing slender runners except in no. 29 *h.*
h. Petals lilac or pale violet.
Leaves minutely hairy on the upper surface; spur large . . 22. *V. Selkirkii.*
Leaves glabrous; spur very short . . . . . 23. *V. palustris.*
h. Petals white, with purple lines on the three lower (WHITE VIOLETS) *i.*
i. Leaves glabrous on both sides, rarely pubescent in no. 25; cleistogamous capsules ellipsoid, green, on erect peduncles.
Leaves lanceolate or linear-lanceolate . . . . . 24. *V. lanceolata.*
Leaves ovate, acute, base subcordate or tapering . . . 25. *V. primulifolia*
Leaves heart-shaped, usually obtuse . . . . . 26. *V. pallens.*
i. Leaves pubescent on one or both sides; cleistogamous capsules ovoid, usually purplish, on erect peduncles only when ripe; seeds brown, 1.5–2 mm. long.
Leaves heart-shaped, minutely hairy above; plant elsewhere glabrous; lateral petals beardless . . . . . 27. *V. blanda.*
Leaves broadly heart-shaped; plant more or less pubescent; lateral petals bearded . . . . . 28. *V. incognita.*
Leaves reniform, pubescent; lateral petals beardless . . 29. *V. renifolia.*

2. **V. cucullàta** Ait. Leaves except the earliest acute or pointed; petaliferous flowers violet-blue becoming darker toward the throat, commonly on peduncles much taller than the leaves; spurred petal glabrous, generally somewhat shorter than the lateral; sepals narrowly lanceolate; cleistogamous flowers on erect or ascending often elongated peduncles; capsules ovoid-cylindric, green, 10–15 mm. long, but little exceeding the long-auricled sepals; seeds dark brown, 1.5 mm. long. (*V. palmata*, var. Gray, in part.) — Wet places, common. — Forms with flowers white or pale lavender are not infrequent.

3. **V. nephrophýlla** Greene. Nearly or quite glabrous; earliest leaves orbicular or slightly reniform, later leaves broadly heart-shaped, obtuse, obscurely crenate, 3–6 cm. wide; flowers large, violet, on peduncles generally exceeding the leaves; spurred petal villous, the upper pair often with scattered hairs; sepals ovate to lanceolate, obtuse and often rounded; cleistogamous flowers on erect or recurved peduncles; capsules green, glabrous, short-ellipsoid; seeds olive-brown. (*V. vagula* Greene.) — Cold mossy bogs, and borders of streams and lakes, e. Que. to B. C., s. to centr. Me., n. w. Ct., s. Ont., Wisc., Col., and Wash.

4. **V. affinis** Le Conte. Leaves that unfold at flowering time narrowly heart-shaped and commonly attenuate toward the apex, becoming 4–6 cm. broad in summer, the margins noticeably crenate-serrate or sometimes irregularly sinuate; petioles slender; petals violet, with the white base conspicuous, spurred petal more or less villous; cleistogamous flowers small, ovoid, on rather long ascending peduncles; capsules ellipsoid, usually purple-dotted, sometimes green, either glabrous or clothed with minute dense pubescence; sepals acuminate, half the length of the capsule, with small appressed auricles; seeds buff-colored. (*V. venustula* Greene.) — Moist thickets and boggy meadows, w. N. E. to Wisc., and southw.

5. **V. latiúscula** Greene. Earliest leaves round-cordate, 2–3 cm. wide, obtuse; mature leaves 4–10 cm. wide, often dilated and abruptly pointed, glabrous except for occasional puberulence or granular roughness on the edges of the petiole near the blade; flowers large, rich violet; spurred petal somewhat villous; outer sepals lanceolate, glabrous, with short rounded auricles; cleistogamous capsules ovoid or ellipsoid, flecked with purple, 8–12 mm. long, the persistent sepals one third as long; seeds brown. — Dry open woods, in light soil, Vt. to N. J.

6. **V. missouriénsis** Greene. Aestival leaves narrowly deltoid with a cordate base, or sometimes broader with rounded basal lobes and pointed apex, rather coarsely crenate-serrate; flowers pale violet, with a darker band above the white center; spurred petal glabrous; sepals ovate-oblong to lanceolate, narrowly

white-margined, slightly ciliolate; capsules from apetalous flowers broadly ellipsoid, finely dotted with purple; seeds buff-colored. — River bottoms and low woods, Mo. and southw.

7. **V. papilionàcea** Pursh. Plants commonly robust from a stout horizontal branching rootstock; leaves often 12 cm. broad, sometimes deltoid in outline above the cordate base, sometimes rounded and abruptly pointed; petioles often sparingly pubescent; petals deep violet, white or greenish-yellow at the base, sometimes wholly white; the spurred petal often narrow and boat-shaped, usually glabrous; outer sepals ovate-lanceolate, rarely ciliolate; cleistogamous flowers ovoid, on horizontal peduncles usually underground but lengthened and erect when the capsules ripen; capsules ellipsoid to cylindric, green or dark purple, 10–15 mm. long; seeds 2 mm. long, dark brown. (*V. palmata*, var. *cucullata* Gray, in part.) — Moist meadows and groves, frequently about dwellings, Mass. to Minn., and southw. Fig. 807.

807. V. papilionacea.

8. **V. Stoneàna** House. Leaves variously 3–9-lobed or parted, the outer segments broadly lunate, all somewhat dentate or incised, narrowed toward the base; the vernal and late summer leaves less deeply cut or not at all, glabrous except for minute hairs on the margin and sometimes on the veins; flowers large, violet, darker towards the throat; spurred petal glabrous; capsules from the cleistogamous flowers ovoid, blotched with purple; seeds buff-colored. — Moist woodlands, N. J., e. Pa., and Md.

9. **V. palmàta** L. Leaves of early summer palmately 5–9-lobed or -parted, the segments variously toothed or cleft, the middle segment usually widest; the first leaves of spring sometimes undivided; petioles and veins of the lower surface densely villous, upper surface often glabrous; flowers violet-purple, 2–3 cm. broad; sepals ovate-lanceolate, rather blunt; cleistogamous flowers on prostrate peduncles, their capsules ovoid, purple-dotted, 8–12 mm. long; seeds brown. — Dry rich woodlands, Mass. to Minn., and southw.

10. **V. tríloba** Schwein. Early foliage purplish, turning yellowish-green at flowering time; some leaves broadly heart-shaped, others 3–5-lobed, the middle segment always broad, the basal segments lunate, the lateral if present narrow, the blade 10–15 cm. wide when mature; petioles densely villous; peduncles mostly glabrous, shorter than the leaves; petals deep violet within, paler without; outer sepals ovate-lanceolate, somewhat obtuse, slightly ciliolate; cleistogamous capsules ovoid, purplish; seeds buff or pale brown. (*V. congener* Le Conte; *V. palmata*, var. *dilatata* Pollard, not Ell.) — Dry woodlands, s. N. E., s. N. Y., and southw. — Freely intergrades with the following.

11. **V. sorória** Willd. In size and habit like no. 7, into which it passes; leaves villous-pubescent especially on the petioles and under surface when young; vernal flowers on peduncles about the length of the leaves, violet to lavender and occasionally white; outer sepals ovate-oblong, commonly obtuse, ciliolate below the middle and on the short rounded auricles; cleistogamous flowers ovoid, on short prostrate peduncles; capsules of these usually purple; seeds dark brown. (*V. palmata*, var. Pollard.) — Moist meadows, alluvial woods, shady ledges and dooryards, w. Que. to Minn., and southw.

12. **V. hirsùtula** Brainerd. The smallest species of the group; leaves commonly appressed to the ground, 2–4 cm. wide, broadly cordate, obtuse, purplish and glabrous beneath, silvery-pubescent above and marked with varying shades of green; petaliferous flowers violet-purple, on peduncles taller than the leaves; apetalous flowers small, ovoid, on short prostrate peduncles; their capsules ovoid, 6–8 mm. long, purple, when ripe raised 3–4 cm. above the leaves; seeds yellow-brown, 20–30 in a capsule. (*V. villosa* of recent auth., not Walt.) — Dry rich woods, s. N. Y. to Ky. and Ga. — *V. villosa*, var. *cordifolia* Nutt., with broader acute leaves less pubescent above, and with infertile capsules and darker seeds, seems to be a cross between *V. hirsutula* and *V. papilionacea*.

13. **V. septentrionàlis** Greene. Leaves 3–7 cm. wide, hirsutulous especially on the margins, veins, and petioles, somewhat pointed but the apex blunt

petioles slender, wiry, often purplish at base; petals variable, 4–12 mm. wide, deep violet to pale lilac, rarely pure white or white suffused with violet, all occasionally bearing scattered hairs; sepals ovate, usually obtuse, closely ciliolate nearly to the tip; cleistogamous flowers sagittate, on horizontal or recurved peduncles; their mature capsules purple (sometimes green), subglobose, 5–8 mm. long, subtended by the spreading ciliolate auricles of the sepals; seeds brown. — Moist open woodlands, especially under conifers, P. E. I., Que., and Ont. to Ct. and w. N. Y.

14. **V. nòvae-ángliae** House. Differs from the last in its narrow cordate-triangular leaves, 2–4 cm. wide at time of petaliferous flowering, in not having ciliolate sepals and auricles, and in flowering a week or two later; in late summer the breadth of leaf often equals its length. — Gravelly beaches of the St. John R., n. Me. (*Fernald*); rocky banks of the Penobscot R., Me. (*Knight*).

15. **V. fimbriátula** Sm. Rootstock becoming long and stout in age, usually erect; the earliest leaves ovate, obtuse, the later ones ovate-oblong, acute, finely pubescent, obscurely crenulate toward the apex, the basal lobes sometimes sharply toothed or incised; flowers violet-purple, on peduncles commonly longer than the leaves; cleistogamous capsules green, ovoid, 6–10 mm. long; auricles of the sepals spreading and ciliate; seeds brown. (*V. ovata* Nutt.; *V. sagittata* Man. ed. 6, in part.) — Sandy fields and dry hillsides, N. S. to Wisc., and southw.

16. **V. sagittàta** Ait. Mature leaves lanceolate or oblong-lanceolate, the blades 4–8 cm. long, hastately or sagittately incised or toothed at the base; the earliest and those produced in late summer often nearly deltoid, obtuse, merely crenate at the base; petals violet-purple; sepals narrowly lanceolate, acute, glabrous; capsules 8–14 mm. long, containing 50–70 brown seeds. — Moist banks and fields, Mass. to Minn., and southw., especially near the coast. — In O. and westw. a pubescent form of the species is prevalent (*V. subsagittata* Greene).

17. **V. emarginàta** Le Conte. Mature leaves approximately triangular, the base truncate or slightly cordate, often decurrent, obscurely crenate-serrate above the middle, coarsely toothed or incised below; petals violet-blue, frequently emarginate; cleistogamous capsules narrowly ovoid, 8–14 mm. long, on peduncles somewhat shorter than the leaves; seeds brown. — Dry woods and hillsides, N. J. and southw.

18. **V. Brittoniàna** Pollard. First leaves reddish beneath, merely dentate; later leaves reniform to ovate in outline, 5–9-lobed or -parted, the lateral segments narrow, the middle segment often much the widest, glabrous except for minute pubescence on the upper surface and margin; flowers large, rich violet, with the white throat conspicuous; sepals linear-lanceolate, acuminate; capsules ovoid-cylindric, 10–18 mm. long, on peduncles about the length of the petioles; seeds about 1.6 mm. long, buff-colored. (*V. septemloba* of auth., not Le Conte; *V. atlantica* Britton, not Pomel.) — In moist sandy or peaty soil near the coast, s. Me., and southw.

19. **V. pectinàta** Bicknell. Leaves ovate-deltoid in general outline, sometimes narrower but often much wider than long, the base truncate, subcordate, or somewhat decurrent on the petiole, the apex acute to acuminate or occasionally blunt, the margin sharply dentate or below the middle closely pectinate; in pubescence, flower, fruit, and seed quite the same as *V. Brittoniana*, with which it is associated in all the known stations. — Damp meadows, Dedham, Mass.; Stratford, Ct.; Woodmere, N. Y.; Dayton, N. J.

20. **V. pedatífida** G. Don. Rootstock short, vertical; leaves palmately parted, the divisions variously cleft and incised into linear lobes; leaves usually cuneate at the base, with prominent flabelliform veins, minutely pubescent on the margin; scapes exceeding the leaves, bearing showy violet flowers; cleistogamous capsules light gray when ripe, 10–15 mm. long, on peduncles commonly shorter than the petioles; seeds 2 mm. long, light brown. — Prairies, n. O. to Sask., southwestw. to N. Mex. — Varies much in leaf-pattern, passing through forms less deeply dissected and with wider oblong lobes (*V. Bernardi* Greene) to forms with leaves somewhat rhomboidal in outline, the base broadly cuneate and entire, the upper contour rounded, sharply cleft and toothed (*V. indivisa* Greene).

21. V. viàrum Pollard. Leaves broadly deltoid, with the basal angles rounded, some undivided, merely crenate-serrate or with a few slight incisions, others hastately 3–7-lobed or -parted, the middle segment broad, acute, serrate; petals rich violet, spurred petal glabrous, narrow, emarginate, nearly tubular from the inrolling of the margins, lateral pair narrow, convergent about the spurred petal, bearing a sparse short clavate beard, upper pair broader, divergent, emarginate; sepals narrowly lanceolate, with rather short entire auricles; cleistogamous fruit on peduncles somewhat shorter than the petioles, pale green when ripe, cylindric-ovoid; seeds olive-brown.—Open ground, waysides and river-banks, Mo. to Kan. and Okla.

22. **V. Selkírkii** Pursh. (Great-spurred V.) Small and delicate; runners all underground; leaves round-cordate, the basal lobes converging or overlapping, crenate, at vernal flowering about 2 cm. wide, when mature 3–4 cm. wide, the upper surface bearing minute spreading hairs, plant otherwise glabrous; scapes about as tall as the leaves; petals all beardless; peduncles of cleistogamous flowers erect or ascending, the capsules subglobose, dotted with purple; seeds small, straw-colored.—Shaded ravines and cold woods, N. B. to w. Mass., n. Pa., L. Superior, and northw., rare. (Greenl.)

23. **V. palústris** L. Smooth; leaves round-cordate and reniform, slightly crenate; flowers small; petals pale lilac, with purple lines, the lateral pair somewhat bearded, spur very short and obtuse.—Alpine region of the White Mts., N. H., and far northw. (Eu.)

24. **V. lanceolàta** L. (Lance-leaved V.) Stolons leafy, often bearing apetalous flowers; leaves and scapes glabrous, 5–8 cm. high at time of vernal flowering; later leaves 20–30 cm. high, the blades obscurely crenulate, gradually tapering into a long margined often reddish petiole; lateral petals usually beardless; sepals lanceolate, acute; cleistogamous capsules 6–12 mm. long, on erect peduncles that are usually shorter than the leaves; seeds dark brown.—Open bogs, moist meadows, and shores, N. S. to Minn., and southw.

25. **V. primulifòlia** L. (Primrose-leaved V.) Leaves oblong or ovate, with either subcordate, obtuse, or tapering base, obscurely crenate-serrate, commonly glabrous; stolons, flowers, and fruit as in the preceding; seeds reddish-brown, about 1.5 mm. long.—Moist or almost dry soil, N. B., southw. along the coast.

26. **V. pállens** (Banks) Brainerd. Leaves heart-shaped, obtuse or rarely acute; petioles and scapes often with scattered hairs, sometimes dotted with red; lateral petals usually bearing a small tuft of hairs, upper petals broadly obovate; seeds small, 1 mm. long, almost black. (*V. blanda* of recent Am. auth., not Willd.)—Springy land and along brooks, Lab. to B. C., s. to the mts. of S. C. and Tenn., Mich., and Wyo.—This and the two species following are commonly known as Sweet White V.

27. **V. blánda** Willd. Glabrous except for minute white hairs on the upper surface of the leaves especially on the basal lobes; leaves commonly acute, often pointed; midribs, petioles, and scapes usually tinged with red; lateral petals beardless, the upper pair often long, narrow, and strongly reflexed, sometimes twisted; in flower 10–15 days later than the two following; freely producing in summer slender leafy runners. (*V. amœna* Le Coute; *V. blanda*, var. *palustriformis* Gray.)—Moist rich woodlands, w. Que. to Minn., and southw. to Ga. and La.

28. **V. incógnita** Brainerd. Peduncles, petioles, and lower surface of leaves more or less pubescent with soft white hairs especially when young, the upper leaf-surface often glabrous; aestival leaves large, rugose, broadly heart-shaped, acute; lateral petals bearded, upper pair obovate; flowering early; in summer producing numerous filiform runners.—Mountain slopes and low moist woodlands, Nfd. and e. Que. southw. to Pa., and westw.

29. **V. renifòlia** Gray. Leaves reniform, often abruptly pointed, more or less pubescent, but upper surface often quite glabrous; petals all beardless, the upper pair orbicular; flowering early; runners rarely present, very short, raceme-like, bearing cleistogamous flowers.—Arbor Vitae swamps and cold woods, Nfd. to the Mackenzie R., s. to N. E., Pa., Mich., and Minn.

§ 3. *Style enlarged upward, abruptly capitate, beakless; stigma within a small orifice on the lower side of the summit* (Fig. 808); *petals yellow.*

808. V. rotundifolia.

30 V. rotundifòlia Michx. (Round-leaved or Early Yellow V.) Rootstock stout, jagged with the persistent bases of former leaves; runners short, usually without roots or leaves, bearing 1–5 cleistogamous flowers, thus simulating racemes; leaves oval or round-cordate, obtuse, repand-crenulate, with short and narrow basal sinus, at flowering time minutely pubescent, 2–3 cm. wide, in midsummer mostly glabrous, 6–10 cm. wide, prostrate; petals bright yellow, the three lower with brown veins, the lateral bearded; capsules ovoid, 6–8 mm. long, closely dotted with purple; seeds nearly white. — Cold woods, centr. Me. to s. w. Ont., O., Pa., Del., and along the Alleghenies to n. Ga. Fig. 808.

§ 4. *Style not club-shaped nor capitate, ending in a small hook pointing downward* (Fig. 809); *petals violet or sometimes white.*

809. V. odorata.

31. V. odoràta L. (English or Sweet V.) Producing above ground leafy stolons; leaves broadly cordate, finely pubescent; flowers very fragrant; summer-capsules broadly ovoid, angled, pubescent, purple; seeds relatively large, cream-colored. — Often cultivated, and occasionally spontaneous. (Introd. from Eu.) Fig. 809.

II. Plants with leafy stems

§ 5. *Style capitate, beakless, bearded at the summit* (Fig. 810); *spur short; stipules entire, the lower more or less scarious.*

Stems numerous, ascending, bearing leaves and flowers from near the base	32. *V. Nuttallii.*
Stems few, mostly erect, not leafy below.	
Petals yellow.	
Nearly glabrous; stem-leaves halberd-shaped or narrowly heart-shaped	33. *V. hastata.*
Softly pubescent; root-leaves often wanting; stem-leaves broad, often over 7 cm. wide	34. *V. pubescens.*
Sparingly pubescent; root-leaves usually 1–2; stem-leaves rarely over 7 cm. wide	35. *V. scabriuscula.*
Petals white inside, outside tinged with violet	36. *V. canadensis.*

32. V. Nuttállii Pursh. Pubescent or nearly glabrous; leaves ovate to oblong-lanceolate, obtuse, entire or slightly crenate, tapering into margined petioles; petals yellow, sometimes violet on the outside. — Prairies, Mo., N. Dak., and westw.

33. V. hastàta Michx. (Halberd-leaved V.) Stem slender, 1–2.5 dm. high, from a horizontal fleshy rootstock; stem-leaves 2–4 near the summit, halberd-shaped or oblong-heart-shaped, slightly serrate, acute; stipules ovate, small. — Woods, n. O., mts. of Pa., and southw.

34. V pubéscens Ait. (Downy Yellow V.) Softly pubescent, 2–3.5 dm. high; stems often solitary; leaves 2–4 near the summit (or occasionally a long-petioled root-leaf), broadly ovate with cordate or truncate-decurrent base, crenate-dentate, somewhat pointed; stipules large, ovate-oblong; petals purple-veined, the lateral bearded; sepals narrowly lanceolate, acute; apetalous flowers abundant in summer on short peduncles; capsules ovoid, glabrous or woolly; seeds light brown, large, nearly 3 mm. long. — Dry rich woods, s. Me. to Ont., Kan., and Md.

35. V. scabriúscula Schwein. (Smooth Yellow V.) Similar to the preceding, with which it intergrades; the more pronounced forms have commonly 2–4 stems and 1–3 radical leaves from one rootstock, the stems shorter and more leafy, the leaves smaller and sparingly pubescent to glabrate, the time of flower-

810. V. canadensis.

ing earlier; flowers, capsules, and seeds as in the preceding. — Moist thickets, often in heavy soil, e. Que. to L. Winnipeg, and southw.

36. **V. canadénsis** L. (Canada V.) Usually 3–4 dm. high, minutely pubescent, glabrate; leaves heart-shaped, pointed, serrate; stipules sharply lanceolate; petaliferous flowers often borne throughout the summer, lateral petals bearded, spurred petal yellow at the base and striped with fine dark lines; sepals slender, acuminate; capsules subglobose, 6–10 mm. long, often downy or puberulent; seeds brown. — Woods, Nfd. to n. Vt., thence southw. and westw. Fig. 810.

§ 6. *Style not capitate, slender* (Fig. 811); *length of spur at least twice its width; stipules fringed-toothed, somewhat herbaceous.*

Tip of the style bent downward, slightly pubescent near the summit; lateral petals bearded; spur less than 8 mm. long.
- Petals white or cream-colored . . . . . 37. *V. striata.*
- Petals pale violet or violet-purple.
  - Stems ascending.
    - Plants glabrous or nearly so.
      - Stipules ovate-lanceolate; later leaves subacuminate . . . 38. *V. conspersa.*
      - Stipules lance-linear; later leaves rounded to an obtuse apex; alpine and northern . . . . . 39. *V. labradorica.*
    - Plants densely puberulent . . . . . 40. *V. arenaria.*
  - Stems prostrate; leaves suborbicular . . . . . 41. *V. Walteri.*

Style straight and glabrous; lateral petals beardless, spur slender, 10–12 mm. long . . . . . 42. *V. rostrata.*

37. **V. striàta** Ait. Usually 15–30 cm. high when in flower, often in late summer 6 dm. high, glabrous or nearly so; leaves heart-shaped, finely crenate-serrate, often acute; stipules large, oblong-lanceolate; spur rather thick, shorter than the petals; sepals ciliate, narrow, attenuate; capsules ovoid, glabrous, 4–6 mm. long; seeds light brown. — Low or shady ground, Ct. to Minn., and southw.

38. **V. conspérsa** Reichenb. Rootstock oblique, often much branched; at time of vernal flowering stems 8–16 cm. high; lower leaves round-reniform, upper round-cordate, crenate, 1.5–3 cm. wide; flowers numerous, usually pale, sometimes white, raised above the leaves on axillary peduncles 5–8 cm. long; in summer the leaves becoming wider, the stems elongating and bearing cleistogamous flowers on short peduncles from the same axils that bore vernal flowers or from the axils of later leaves; seeds straw-colored. (*V. Muhlenbergii* Torr.; *V. labradorica* of recent Am. auth., not Schrank.) — Common in low or shaded ground, e. Que. to Minn., and southw. Fig. 811.

811. V. conspersa.

39. **V. labradórica** Schrank. Habit of the preceding but more dwarf; stems and petioles nearly or quite glabrous; stipules narrow, lance-linear; leaf-blades more or less hispidulous above, the later ones rounded to an obtuse (not in the least acuminate) apex; petals commonly deep violet, more rarely paler; seeds light brown. (*V. Muhlenbergiana*, var. *minor* Hook.) — Greenl. and Lab., s. to cool or alpine situations of Me., N. H., and n. N. Y.

40. **V. arenària** DC. Low, tufted; stems several or many; leaves 1–2 cm. broad, thickish, densely puberulent on both surfaces, ovate, often subcordate, narrowed above to an obtuse apex; spur usually straight and blunt, but sometimes with a sharp point abruptly bent inward; cleistogamous flowers and capsules abundant in late summer; seeds brown. (*V. canina*, var. *puberula* Wats.) — Sandy and sterile soil, e. Que. to n. e. Mass., westw. to Minn. and Sask. (Eu.)

41. **V. Waltèri** House. Blossoming first from rosettes of radical leaves, afterwards producing prostrate leafy stems that bear cleistogamous flowers; leaves orbicular to reniform, with cordate base, 1–4 cm. wide, crenulate, often dark-colored along the veins; flowers and fruit much as in *V. conspersa.* (*V. multicaulis* Britton, not Jord.) — Rocky or sandy ground, Ky. to Fla. and Tex.

42. **V. rostràta** Pursh. (Long-spurred V.) Stems often numerous, commonly 1–1.2 dm. high; leaves round-heart-shaped, nearly or quite glabrous, serrate, the upper acute or pointed; petals lilac-colored with a violet spot near the center, borne on long peduncles above the leaves; cleistogamous flowers with minute or abortive petals appearing later on short peduncles from the axils of the upper leaves; capsules ovoid, 3–5 mm. long, glabrous; seeds yellowish-brown. — Shaded hillsides, w. Que. to Mich., and southw. in the Alleghenies to Ga.

§ 7. *Style much enlarged upward into a globose hollow summit with a wide orifice on the lower side* (Fig. 812); *stipules large, leaf-like, lyrate-pinnatifid.*

Stipules pinnatisect at the base; upper leaves crenately serrate; introduced species.
- Petals 2–3 times as long as the sepals . . . . . 43. *V. tricolor.*
- Petals seldom longer than the sepals . . . . . 44. *V. arvensis.*

Stipules palmately pectinate at the base; upper leaves entire or nearly so; indigenous . . . . . 45. *V. Rafinesquii.*

43. **V. trícolor** L. (Pansy, Heart's-ease.) Stems angled, 1.5–3 dm. high; lower leaves roundish or cordate, upper oblong, crenate; flowers large and widely spreading, variously marked with yellow, white, and purple; capsules ovoid; seeds brown. — An escape from cultivation, rarely persisting. (Introd. from Eu.) Fig. 812.

812. V. tricolor.

44. **V. arvénsis** Murr. (Wild Pansy.) Similar to the preceding, but smaller; petals all pale yellow, usually shorter than the rather long lanceolate acute sepals; capsules globose. — Old fields, frequent, Nfd. to N. E. and Ont. (Nat. from Eu.)

45. **V. Rafinésquii** Greene. (Wild Pansy.) Very slender, often branched from the base; root annual; leaves small, the earliest suborbicular, on slender petioles, the later obovate to linear-oblanceolate, attenuate at the base; internodes usually exceeding the leaves; flowers small, 7–10 mm. long, the obovate bluish-white to cream-colored petals nearly twice the length of the sepals. (*V. tenella* Raf., not Poir.; *V. tricolor*, var. *arvensis* Man. ed. 6, not DC.) — Woods and open places, N. Y. to Mich., Tex., and Ga.

PASSIFLORÀCEAE (Passion Flower Family)

Herbs or woody plants, climbing by tendrils, with perfect flowers, 5 monadelphous stamens, and a stalked 1-celled ovary free from the calyx, with 3 or 4 parietal placentae, and as many club-shaped styles.

1. PASSIFLÒRA L. Passion Flower

Calyx of 5 sepals shortly united at the base; the throat crowned with a double or triple fringe. Petals 5, on the throat of the calyx. Filaments united into a tube which sheathes the long stalk of the ovary, separate above; anthers large, fixed by the middle. Berry (often edible) many-seeded. Leaves alternate, generally palmately lobed, with stipules. Peduncles axillary, jointed. — Ours are perennial herbs. (An adaptation of *flos passionis*, a translation of *fior della passione*, the popular Italian name early applied to the flower from a fancied resemblance of its parts to the implements of the crucifixion.)

1. **P. lùtea** L. Smooth, slender; *leaves obtusely 3-lobed at the summit, the lobes entire;* petioles glandless; flowers greenish-yellow, 2.5 cm. broad; fruit 1.2 cm. in diameter. — Damp thickets, s. Pa. to Mo., Tex., and Fla.

2. **P. incarnàta** L. Pubescent; *leaves 3–5-cleft, the lobes serrate*, the base bearing 2 glands; flower large (5 cm. broad), nearly white, with a triple purple and flesh-colored crown; involucre 3-leaved; fruit as large as a hen's egg. — Dry soil, Va. to Fla., w. to Mo. and Tex. — Fruit called Maypops.

LOASÀCEAE (Loasa Family)

Herbs, with a rough or stinging pubescence, no stipules, the calyx-tube adherent to a 1-*celled ovary with* 2 *or* 3 *parietal placentae;* — represented here only by the genus

1. MENTZÈLIA [Plumier] L.

Calyx-tube cylindrical or club-shaped; the limb 5-parted, persistent. Petals 5 or 10, regular, spreading, flat, convolute in the bud, deciduous. Stamens inserted with the petals on the throat of the calyx. Styles 3, more or less united into 1; stigmas terminal, minute. Capsule at length dry and opening at the summit. Seeds flat, anatropous. — Stems erect. Leaves alternate, very adhesive by the barbed pubescence. (Dedicated to *C. Mentzel*, an early German botanist.)

1. **M. oligospérma** Nutt. (Stick Leaf.) Much branched, 3–9 dm. high; *leaves ovate and oblong*, cut-toothed or angled, often petioled; *flowers yellow*, 1.5–2 *cm. broad*, opening in sunshine; *petals* 5, wedge-oblong, pointed; stamens 20 or more; capsule small, about 9-seeded. — Limestone hills and banks, Ill. to Kan. and Col., s. to Tex. May–Aug.

2. **M. decapétala** (Pursh) Urban & Gilg. Larger in all its parts; *leaves elongate-lanceolate*, sharply and coarsely dentate; *flowers white or pale yellow*, 7–12 *cm. broad*, opening in the evening; *petals* 10, lanceolate; stamens abundant; seeds numerous. — Rocky hillsides and dry prairies, n. w Ia. to Sask., Tex., and westw. July–Sept.

CACTÀCEAE (Cactus Family)

Fleshy and thickened mostly leafless plants, globular or columnar and many-angled, or flattened and jointed, usually with prickles. Flowers solitary, sessile; the sepals and petals numerous, imbricated in several rows, the bases adherent to the 1-celled ovary. Stamens numerous, inserted on the inside of the tube or cup formed by the union of the sepals and petals. Style 1; stigmas numerous.

1. **Mamillaria.** Globose or ovoid plants, covered with spine-bearing tubercles. Flowers from between the tubercles. Ovary naked; berry succulent.
2. **Opuntia.** Branching or jointed plants; the joints flattened or cylindrical.

1. MAMILLÀRIA Haw.

Flowers about as long as wide, the tube campanulate or funnel-shaped. Ovary often hidden between the bases of the tubercles, naked, the succulent berry exserted. Seeds yellowish-brown to black, crustaceous. — Globose or ovoid plants, covered with spine-bearing cylindrical, ovoid, or conical tubercles, the flowers from distinct woolly or bristly areoles at their base. (Name from *mamilla*, a nipple, referring to the tubercles.)

1. **M. vivípara** (Nutt.) Haw. Single or tufted, 2.5–12 cm. high, the almost terete tubercles bearing bundles of 5–8 reddish-brown spines (2 cm. long or less) surrounded by 15–20 grayish ones in a single series, all straight and rigid; *flowers red or purple*, with fringed sepals and lance-subulate petals; *berries ovoid, green; seeds* pitted, *light brown.* (*Cactus* Nutt.) — Granite ledges, w. Minn. (*Moyer*), and on prairies and dry plains to Alb. and Cal.

2. **M. missouriénsis** Sweet, var. **caespitòsa** (Engelm.) Wats. Smaller, stems globose, clustered, the tubercles with fewer (10–20) weaker ash-colored spines; *flowers yellow*, 2.5–5 cm. broad; *berry subglobose, scarlet; seeds* few, pitted, *black.* (*Cactus missouriensis*, var. *similis* Coult.) — Dry prairies, e. Kan. to Tex., and westw.

2. OPÚNTIA [Tourn.] Mill. Prickly Pear. Indian Fig

Sepals and petals not united into a prolonged tube, spreading, regular, the inner roundish. — Stem composed of joints (flattened in ours), bearing very small awl-shaped and usually deciduous leaves arranged in a spiral order, with clusters of barbed bristles and often spines in their axils. Flowers in our species yellow, opening in sunshine for more than one day. (A name of Theophrastus, originally belonging to some different plant.)

** Spines small or none; fruit pulpy.*

1. **O. vulgàris** Mill. Prostrate or spreading, *light green;* joints broadly obovate, 5–10 cm. long; *leaves minute* (4–5 mm. long), ovate-subulate, *generally appressed;* bristles short, greenish-yellow; spines solitary or more often none; *flowers* pale yellow, *about* 5 *cm. broad, with about* 8 *petals;* fruit 2.5 cm. long. — Sandy fields and dry rocks, Nantucket to S. C., near the coast; Falls of the Potomac.

2. **O. Rafinésquii** Engelm. Prostrate, *deep green;* joints broadly obovate or orbicular, 7–12 cm. long; *leaves* 6–8 *mm. long, spreading;* bristles bright red-brown, with a few small spines and a single strong one (1.8–2.4 cm. long) or none; *flowers* yellow, 6–9 *cm. broad, sometimes with a reddish center; petals* 10–12; fruit 3.6 cm. long, with an attenuated base. (Probably *O. cespitosa, mesacantha,* and *humifusa* Raf., in part.) — Sandy soil, limestone bluffs, etc., n. O. and Mich. to Minn., and s. to Ky. and Tex.

Var. **minor** Engelm. Dwarf; joints orbicular, 5 cm. in diameter, nearly spineless. — Sandstone rock, s. Mo. (*Engelmann* according to Coulter.)

*** Very spiny; fruit dry and prickly.*

3. **O. polyacántha** Haw. Prostrate, joints light green, broadly *obovate, flat and tuberculate,* 5–15 cm. long; leaves small (3–4 mm. long), *their axils armed with a tuft of straw-colored bristles and* 5–10 *slender radiating spines* (2.5–5 cm. long); flowers light yellow, 5–7.5 cm. broad; fruit with spines of variable length. (*O. missouriensis* DC.) — Wisc. to Mo., and westw. across the plains; very variable.

4. **O. frágilis** (Nutt.) Haw. Subdecumbent; *joints small* (2.5–5 cm. long or less), *ovate, compressed or tumid, or even terete;* leaves hardly 2 mm. long, red; *bristles few, larger spines* 1–4, *cruciate, with* 4–6 *smaller white radiating ones below;* flowers yellow. — Minn., Ia., Kan., and westw.

THYMELAEÀCEAE (Mezereum Family)

Shrubs, with acrid and very tough (not aromatic) bark, entire leaves, and perfect flowers with a regular and simple colored calyx, bearing usually twice as many stamens as its lobes, free from the 1-*celled and* 1-*ovuled ovary,* which forms a berry-like drupe in fruit, with a single suspended anatropous seed. Embryo large; albumen little or none.

1. **Dirca.** Calyx tubular, without spreading lobes. Stamens (8) and style exserted.
2. **Daphne.** Calyx-lobes (4) spreading. Stamens (8) included. Style short or none.

1. DÍRCA L. Leatherwood. Moosewood

Calyx petal-like, tubular-funnel-shaped, truncate, the border wavy or obscurely about 4-toothed. Stamens inserted on the calyx above the middle, the alternate ones longer. Style thread-form. Drupe ovoid, reddish. — A much branched bush, with jointed branchlets, oval-obovate alternate leaves on very short petioles, the bases of which conceal the buds of the next season. Flowers light yellow, preceding the leaves, 3 or 4 in a cluster from a bud of as many dark-hairy scales, these forming an involucre, from which soon after proceeds a leafy branch. (Name of uncertain derivation.)

1. D. palústris L. (Wicopy.) Shrub, 1–2 m. high; the wood white, soft, and very brittle; but the fibrous bark remarkably tough (used by the Indians for thongs, whence the popular names). — Damp rich woods, N. B. to Ont., and southw. Apr.

2. DÁPHNE L. Mezereum

Calyx salver-shaped or somewhat funnel-shaped. Anthers nearly sessile on the calyx-tube. Stigma capitate. Drupe red. — Hardy low shrub. (Mythological name of the nymph transformed by Apollo into a Laurel.)

1. D. Mezèreum L. Shrub, 3–9 dm. high, with purple-rose-colored (rarely white) flowers, in lateral clusters on shoots of the preceding year, before the lanceolate smooth leaves. — Escaped from cultivation, and locally established, w. Que. and Ont. to Mass. and N. Y. Early spring. (Introd. from Eu.)

ELAEAGNÀCEAE (Oleaster Family)

Shrubs or small trees, with silvery-scurfy leaves and perfect or dioecious flowers; further distinguished from the Mezereum Family by the erect or ascending albuminous seed, and the calyx-tube which becomes pulpy and berry-like in fruit, strictly inclosing the achene.

1. **Elaeagnus.** Flowers perfect. Stamens 4. Leaves alternate.
2. **Shepherdia.** Flowers dioecious. Stamens 8. Leaves opposite.

1. ELAEÁGNUS [Tourn.] L.

Calyx cylindric-campanulate above the persistent cylindrical or globose base, the limb valvately 4-cleft, deciduous. Stamens 4, in the throat. Style linear, stigmatic on one side. Fruit drupe-like, with an ellipsoid 8-striate stone. — Leaves alternate, entire and petioled, and flowers axillary and pedicellate. (From ἐλαία, *the olive*, and ἄγνος, the Greek name of the Chaste-tree, *Vitex Agnus-castus*.)

1. E. argéntea Pursh. (Silverberry.) A stoloniferous unarmed shrub, 2–4 m. high, the younger branches covered with ferruginous scales; leaves elliptic to lanceolate, undulate, silvery-scurfy and more or less ferruginous; flowers numerous, deflexed, silvery without, pale yellow within, fragrant; fruit round-ovoid, dry and mealy, edible, 8–10 mm. long. — Bonaventure R., Que. (*Post*); and from Isle of Orleans, Que., to Hudson Bay and B. C., s to Minn., S. Dak., and Utah.

2. SHEPHÉRDIA Nutt.

Flowers dioecious; the sterile with a 4-parted calyx (valvate in the bud) and 8 stamens, alternating with as many processes of the thick disk; the fertile with an urn-shaped 4-cleft calyx, inclosing the ovary (the orifice closed by the teeth of the disk) and becoming berry-like in fruit. Style slender; stigma 1-sided. — Leaves opposite, entire, deciduous; the small flowers nearly sessile in their axils on the branches, clustered, or the fertile solitary. (Named for *John Shepherd*, once curator of the Liverpool Botanic Garden.) Lepargyrea Raf.

1. S. canadénsis (L.) Nutt. Shrub, 1–2 m. high; *leaves elliptical or ovate, nearly naked and green above*, silvery-downy and scurfy with rusty scales beneath; fruit yellowish-red, nauseous. (*Lepargyrea* Greene.) — Calcareous rocks and banks, Nfd. to Alaska, s. to N. S., Me., Vt., n. and w. N. Y., Mich., Wisc., and along the Rocky Mts. to N. Mex. May.

2. S. argéntea Nutt. (Buffalo Berry.) Somewhat thorny, 1–6 m. high; *leaves cuneate-oblong, silvery on both sides;* fruit ovoid, scarlet, acid and edible (*Lepargyrea* Greene.) — Man. and n. Minn. to Kan., and westw

LYTHRÀCEAE (Loosestrife Family)

Herbs, with mostly opposite entire leaves, no stipules, the calyx inclosing but free from the 1–4-celled many-seeded ovary and membranous capsule, and bearing the 4–7 deciduous petals and 4–14 stamens on its throat, the latter lower down. Style 1; stigma capitate, or rarely 2-lobed. Flowers axillary or whorled, rarely irregular, perfect, sometimes dimorphous or even trimorphous, those on different plants with filaments and style reciprocally longer and shorter. Petals sometimes wanting. Capsule often 1-celled by the early breaking away of the thin partitions; placentae in the axis. Seeds anatropous, without albumen. — Branches usually 4-sided.

* Flowers regular or nearly so.

+ Calyx short, campanulate or globular.

1. **Didiplis.** Calyx without appendages. Petals none. Stamens 4. Capsule globular, indehiscent, 2-celled. Small aquatic.
2. **Rotala.** Calyx with the sinuses appendaged. Petals and stamens 4. Capsules 4-celled, septicidal, with 3–4 valves.
3. **Ammannia.** Flowers not trimorphous. Petals generally 4 or none. Stamens 4–8. Capsule globular, 2–4-celled, bursting irregularly.
4. **Decodon.** Flowers trimorphous. Petals 5 (rarely 4). Stamens 8–10. Capsules 3–4-valved, loculicidal. Leaves often whorled.

+ + Calyx tubular, cylindrical.

5. **Lythrum.** Petals usually 6. Stamens mostly 6 or 12.

* * Flowers irregular and unsymmetrical, with 6 petals and 11–12 stamens in 2 sets.

6. **Cuphea.** Calyx spurred or enlarged on one side at base. Petals unequal.

1. DIDIPLIS Raf. Water Purslane

Submersed aquatic (sometimes terrestrial), rooting in the mud, with opposite linear leaves, and very small greenish flowers solitary in their axils. (In the words of Rafinesque "Didiplis means *two doubling;*" from *δίς*, *twice*, and *διπλόος*, *double*, in reference presumably to the stamens.)

1. **D. diándra** (Nutt.) Wood. Leaves when submersed elongated, thin, closely sessile by a broad base, when emersed shorter and contracted at base; calyx with broad triangular lobes; style very short; capsules very small. (*D. linearis* Raf.) — Minn. and Wisc. to Tex., e. to N. C. and Fla.

2. ROTÀLA L.

Petals 4 (in ours). Capsule-valves (under a strong lens) transversely and closely striate. (Name a diminutive of *rota*, a wheel, from the whorled leaves of the original species.)

1. **R. ramòsior** (L.) Koehne. Leaves tapering at base or into a short petiole, linear-oblanceolate or somewhat spatulate; flowers solitary (rarely 3) in the axils, sessile; accessory teeth of calyx as long as the lobes or shorter. (*Ammannia humilis* Michx.) — Low or wet ground, Mass. to Fla. and Tex., and in the interior from O. to Minn., and southw. (Trop. Am.)

3. AMMÁNNIA [Houston] L.

Flowers small, in 3–many-flowered axillary cymes. Calyx globular or bell-shaped, 4-angled, 4-toothed, usually with a little horn-shaped appendage at each sinus. Petals 4 (purplish), small and deciduous, sometimes wanting. — Low and inconspicuous smooth herbs, with opposite narrow leaves. (Named for *Paul Ammann*, a German botanist prior to Linnaeus.)

1. **A. coccínea** Rottb. Leaves linear-lanceolate, 5–7 cm. long, with a broad auricled sessile base; *cymes subsessile*, dense; petals purplish; stamens more or less exserted; *style long and slender.* — Muddy banks and wet sandy shores, N. J. to Fla.; and from O. to Dak. and southw.

2. **A. Koèhnei** Britton. Leaves oblong to oblanceolate, the lowest contracted, the others broadly auricled at the base; *cymes sessile* or nearly so; *style very short;* petals minute, pink, fugacious. — Swamps, N. J. (according to Britton) to Fla. — Differs from the tropical *A. latifolia* L. only in having petals.

3. **A. auriculàta** Willd. Erect, few-branched; leaves lanceolate to narrowly oblong, acute; *cymes on slender peduncles* (4–6 mm. long); fruit small; style relatively long. — Borders of ponds, etc., w. Mo. and Neb. to Tex., and southwestw.

4. DÉCODON J. F. Gmel. Swamp Loosestrife

Calyx with 5–7 erect teeth, and as many longer and spreading horn-like processes at the sinuses. Stamens exserted, of two lengths. Capsule globose, 3–5-celled, loculicidal. — Perennial herbs or slightly shrubby plants, with opposite or whorled leaves, and axillary clusters of trimorphous flowers. (Name from δέκα, *ten*, and ὀδούς, *tooth.*)

1. **D. verticillàtus** (L.) Ell. (Water Willow.) Smooth or downy; stems recurved, 6–25 dm. long, 4–6-sided; leaves lanceolate, nearly sessile, opposite or whorled, the upper with clustered short-pedicelled flowers in their axils; petals 5, wedge-lanceolate, magenta, 1.2 cm. long; stamens 10, half of them shorter. — Swampy grounds, Me. to Fla., La., and Minn. — Bark of submersed parts of the stem often spongy-thickened.

5. LÝTHRUM L. Loosestrife

Calyx cylindrical, striate, 5–7-toothed, with as many little processes in the sinuses. Petals 5–7. Stamens as many as the petals or twice the number, inserted low down on the calyx. Capsule subcylindrical, 2-celled. — Slender herbs, with pink or magenta (rarely white) flowers in summer. (From λύθρον, *blood;* perhaps from the styptic properties.)

* *Stamens and petals* 5–7; *flowers small, solitary and nearly sessile in the axils of the mostly scattered upper leaves; proper calyx-teeth often shorter than the intermediate processes; plants smooth.*

1. **L. Hyssopifòlia** L. *Annual*, 1–6 dm. high, pale; leaves oblong-linear, obtuse, longer than the inconspicuous flowers; petals pale-purple; stamens usually 4–6, included. — Marshes and sterile soil, near the coast, Me. to N. J.; also on the Pacific coast. (Eu.)

2. **L. lineàre** L. *Stem* slender and tall (1–1.3 m. high), bushy at top, *with 2 margined angles; leaves linear, chiefly opposite;* petals whitish; flowers with 6 included stamens and a long style, or the stamens exserted and style short; *ovary on a thick short stalk; no fleshy hypogynous ring.* — Brackish marshes, N. J. to Fla. and Tex.

3. **L. alàtum** Pursh. Tall and wand-like *perennial; branches with margined angles; leaves oblong-ovate to linear-lanceolate, acute, with a cordate or rounded base*, the upper mostly *alternate; calyx about* 4–6 *mm. long;* petals rather large, deep purple; *stamens of the short-styled flowers exserted; fleshy hypogynous ring prominent.* — Swamps and meadows, Ont. to Minn., s. to Ga., La., and Col.; also locally in e. Mass. and Ct.

The allied Mexican L. Vulnerària Ait., with calyx 9–12 mm. long, has been reported from the vicinity of St. Louis, Mo.

** *Stamens* 12 (*rarely* 8 *or* 10), *twice the number of the petals*, 6 *longer and* 6 *shorter; flowers large, crowded and whorled in an interrupted spike.*

4. **L. Salicària** L. (Spiked L.) *More or less downy* and tall; *leaves* lanceolate, *heart-shaped at base*, sometimes whorled in threes; flowers magenta.

trimorphous in the relative lengths of the stamens and style; *calyx and bracts* greenish, somewhat *pubescent*, the calyx-lobes much shorter than the subulate appendages. — Wet meadows, local, N. E. to Del. and D. C. (Introd. from Eu.) June–Sept. Var. TOMENTÒSUM (Mill.) DC. Calyx and bracts white-tomentose. — Wet meadows and shores, e. Que. to Vt. and s. Ont. (Nat. from Eurasia.)

5. **L.** VIRGÀTUM L. Similar, *glabrous throughout; leaves narrowed to the* sessile or short-petioled *base;* the calyx-lobes shorter than or equaling the appendages. — Locally established, e. Mass. (*S. F. Poole*). (Introd. from Eurasia.)

6. CÙPHEA P. Br.

Calyx tubular, 12-ribbed, gibbous or spurred at the base on the upper side, 6-toothed at the apex, and usually with as many little processes in the sinuses. Ovary with a curved gland at the base next the spur of the calyx, 1–2-celled; style slender; stigma 2-lobed. Capsule oblong, few-seeded, early ruptured through one side. — Flowers solitary or racemose, stalked. (Name from κυφός, *gibbous*, from the shape of the calyx.)

1. **C. petiolàta** (L.) Koehne. (CLAMMY C.) Annual, very viscid-hairy, branching; leaves ovate-lanceolate; petals ovate, short-clawed, purple; seeds flat. (*C. viscossima* Jacq.; *Parsonsia* Rusby.) — Dry fields, N. H. (*Miss Scorgie*) to Ga., w. to Kan. and La.

MELASTOMÀCEAE (MELASTOMA FAMILY)

Plants with opposite 3–7-ribbed leaves, and definite stamens, the anthers opening by pores at the apex; otherwise much as in the Onagraceae. — All tropical, except the genus

1. RHÉXIA L. DEERGRASS. MEADOW BEAUTY

Calyx-tube urn-shaped, adherent to the ovary below, and continued above it, persistent, 4-cleft at the apex. Petals 4, convolute in the bud, oblique, inserted with the 8 stamens on the summit of the calyx-tube. Anthers long, 1-celled, inverted in the bud. Style 1; stigma 1. Capsule 4-celled, with 4 many-seeded placentae projecting from the central axis. Seeds coiled like a snail-shell, without albumen. — Low perennial often bristly herbs with showy cymose flowers in summer; the petals falling early. (A name used by Pliny for some unknown plant.)

* *Anthers linear, curved, with a minute spur on the back at the attachment of the filament above its base; flowers cymose, peduncled.*

1. **R. virginica** L. *Stem square*, with wing-like angles; *leaves oval-lanceolate, sessile, acute;* calyx-tube and pedicels more or less hispid with gland-tipped hairs; petals magenta. — Sandy swamps and shores, Me. to Fla.; also from s. w. Ont. to s. e. Ia., and southw. July–Sept. — Slender rootstocks tuberiferous.

2. **R. aristòsa** Britton. Branches somewhat wing-angled; *leaves linear-oblong, sessile*, not narrowed at base, naked or very sparsely hairy; hairs of the calyx mostly below the throat, not gland-tipped; petals sparsely villous, pink or purplish. — Wet pine barrens, Egg Harbor City, N. J. (*J. E. Peters*) to Ga. July, Aug.

3. **R. mariàna** L. *Stems cylindrical; leaves linear-oblong*, narrowed below, mostly petiolate; petals paler. — Sandy swamps, L. I. to Fla., w. to Mo. and Tex.

** *Anthers oblong, straight, without any spur; flowers few, sessile.*

4. **R. ciliòsa** Michx. Stem square, glabrous; leaves broadly ovate, ciliate with long bristles; calyx glabrous. — Md. to Fla. and La.

ONAGRÀCEAE (Evening Primrose Family)

Herbs, with 4-merous (sometimes 2–3- or 5–6-merous) perfect and symmetrical flowers; the tube of the calyx adhering to the 2–4-celled ovary, its lobes valvate in the bud or obsolete; the petals convolute in the bud, sometimes wanting; and the stamens as many or twice as many as the petals or calyx-lobes, inserted on the summit of the calyx-tube. Style single, slender; stigma 2–4-lobed or capitate. Pollen-grains often connected by cobwebby threads. Seeds anatropous, small, without albumen. — Mostly herbs, with opposite or alternate leaves. Stipules none or glandular.

* Parts of the flower in fours or more numerous.

+ Fruit a many-seeded pod, usually loculicidal.

++ Calyx-limb (divided to the summit of the ovary) persistent.

1. **Jussiaea.** Petals 4–6. Stamens twice as many. Capsule elongated, 4–6-celled.
2. **Ludvigia.** Petals 4 or none. Stamens 4. Capsule short.

+ ++ Calyx-tube or deeply cleft limb deciduous from the summit of the capsule; petals 4; stamens 8.

3. **Epilobium.** Seeds silky-tufted. Flowers (in ours) not yellow. Lower leaves often opposite.
4. **Oenothera.** Seeds not tufted. Flowers mostly yellow. Leaves alternate.

+ + Fruit dry and indehiscent, 1–4-seeded.

++ Terrestrial; leaves alternate; stamens 6–8.

5. **Gaura.** Calyx-tube obconical. Filaments appendaged at base.
6. **Stenosiphon.** Calyx-tube filiform. Filaments (8) not appendaged.

++ ++ Aquatic; leaves opposite or whorled; stamens 4.

7. **Trapa.** Calyx-tube short. Filaments unappendaged. Fruit large, coriaceous, turbinate.

* * Parts of the flower in twos; leaves opposite.

8. **Circaea.** Petals 2, obcordate or 2-lobed. Stamens 2. Fruit 1–2-seeded, bristly.

1. JUSSIAÈA L. Primrose-willow

Calyx-tube elongated, not at all prolonged beyond the ovary; the lobes 4–6, herbaceous and persistent. — Herbs (ours glabrous perennials), with mostly entire and alternate leaves, and axillary yellow flowers in summer. (Dedicated to *Bernard de Jussieu*, the founder of the Natural System of Botany.)

1. **J. decúrrens** (Walt.) DC. *Stem erect*, 3–6 dm. high, winged by the decurrent lanceolate leaves; *calyx-lobes* 4, as long as the petals; *capsule cylindric-club-shaped, wing-angled;* seeds in several rows in each cell. — Wet places, "Md." and Va. to Fla.; s. Ill. and Mo. to La. and Tex.

2. **J. diffùsa** Forsk. *Stem creeping, or floating and rooting; leaves oblong, tapering into a slender petiole;* flowers large, long-peduncled; *calyx-lobes and obovate petals* 5; pod woody, cylindrical, with a tapering base; seeds quadrate, in 1 row in each cell, adherent to the spongy endocarp. (*J. repens* of auth., probably not of L.) — In water or on muddy banks, Ky. and Ill. to e. Kan., and southw.

2. LUDVÍGIA L. False Loosestrife

Calyx-tube not at all prolonged beyond the ovary; the lobes 4, usually persistent. Capsule short or cylindrical, many-seeded. — Perennial herbs, with axillary (rarely capitate) flowers through summer and autumn. (Named for *C. G. Ludwig*, Professor of Botany at Leipsic, contemporary with Linnaeus.)

* *Leaves all alternate, sessile or nearly so.*

+ *Flowers peduncled in the upper axils, with conspicuous yellow petals* (8–16 *mm. long*), *equaling the ovate or lanceolate foliaceous lobes of the calyx.*

1. **L. alternifòlia** L. (SEEDBOX.) *Smooth* or nearly so, branched, 1 m. high; roots fascicled, fusiform; *leaves lanceolate to linear-lanceolate, acute or pointed at both ends;* capsules cubical, rounded at base, wing-angled. — Shady banks, low wet woods, and swamps, e. Mass. to Fla. and Tex.; and in the interior from s. w. Ont. to Kan., and southw.

Var. **linearifòlia** Britton. Leaves linear; calyx-lobes linear-lanceolate. — W. Va.

2. **L. hirtélla** Raf. *Hairy;* roots clustered, fusiform-thickened; stems nearly simple, 3–8 dm. high; *leaves oblong, or the upper lanceolate, blunt at both ends;* capsules nearly as in the last, but scarcely wing-angled. — Moist pine barrens, N. J. to Fla. and Tex.

+ + *Flowers small, sessile* (*solitary or sometimes clustered*) *in the axils; petals small and greenish or none; leaves mostly lanceolate or linear on the erect stems* (3–9 *dm. high*) *and numerous branches; but prostrate or creeping sterile shoots often produced from the base, thickly beset with shorter obovate or spatulate leaves.* (*Our species glabrous, except* no. 3.)

++ *Capsule about as broad as long.*

3. **L. sphaerocárpa** Ell. Minutely pubescent, especially the calyx, or nearly glabrous; leaves lanceolate or linear, acute, tapering at base, those of the runners obovate with a wedge-shaped base, glandular-denticulate; *bractlets minute, obsolete, or none; capsules globular or depressed* (sometimes acute at base), not longer than the calyx-lobes (less than 4 mm. long). — Water or wet swamps, e. Mass. to Fla. and La. — Bark below often spongy-thickened.

4. **L. polycárpa** Short & Peter. Stoutish; leaves narrowly lanceolate, acute at both ends, those of the runners oblong-spatulate, acute, entire; *bractlets linear-awl-shaped and conspicuous on the base of the* 4-*sided somewhat top-shaped capsule*, which is longer than the *lanceolate calyx-lobes.* — Wet places, e. Mass. to Ct.; s. w. Ont. and O. to Neb., s. to Tenn. and Kan.

5. **L. alàta** Ell. Very similar to the preceding but more slender; *calyx-lobes* short, *broadly deltoid.* — Jackson, Mo. (*Bush* according to Tracy); N. C. to Fla and "La."

++ *Capsule decidedly longer than broad.*

6. **L. lineàris** Walt. Slender, mostly low; leaves narrowly linear, those of the short runners obovate; minute petals usually present; *bractlets minute, at the base of the elongated top-shaped* 4-*sided capsule*, which is 6 mm. long and much longer than the calyx-lobes. — Bogs, pine barrens of "N. Y.," N. J., and southw.

7. **L. glandulòsa** Walt. Much branched; leaves oblong- or spatulate-lanceolate, tapering at the base or even petioled; *bractlets very minute at the base of the cylindrical capsule*, which is 6 mm. long, and several times exceeds the calyx-lobes. (*L. cylindrica* Ell.) — Low shady woods, about ponds, and in swamps, s. Ill. to Fla. and Tex.

* * *Leaves all opposite; stems creeping or floating.*

8. **L. palústris** (L.) Ell. (WATER PURSLANE.) Smooth; leaves ovate or oval, tapering into a slender petiole; *petals none, or* small and *reddish* when the plant grows out of water; calyx-lobes very short; *capsules* 4-*sided, not tapering at base*, sessile in the axils, 4 *mm. long.* (*Isnardia* L.) — Ditches and wet shores, common. (Eu.)

9. **L. arcuàta** Walt. Smooth, small and creeping; leaves oblanceolate, nearly sessile; flowers solitary, long-peduncled; *petals yellow*, exceeding the calyx (6 mm. long); *capsules* club-shaped, somewhat curved, 8 *mm. long.* (*Ludwigi antha* Small.) — Swamps, Va. to Fla.

3. EPILÒBIUM L. Willow-herb

Calyx-tube scarcely or not at all prolonged beyond the ovary; limb 4-cleft or -divided. Petals 4, violet, magenta, pink, or white. Capsule slender, many-seeded. Seeds with a tuft of long hairs at the end. — Mostly perennial herbs with nearly sessile leaves. (Name from ἐπί, *on*, and λόβιον, *a little pod.*)

§ 1. CHAMAENÈRION [Tourn.] Tausch. *Petals entire, large, magenta (rarely white); calyx-limb divided essentially to the summit of the ovary; stamens and style successively deflexed; stigma of 4 long lobes; flowers racemed.*

1. **E. angustifòlium** L. (Great W., Fireweed.) Tall (0.3–2 m. high), simple; leaves scattered, long, lanceolate, subentire, pinnately veined. (*E. spicatum* Lam.; *Chamaenerion angustifolium* Scop.) — Low ground, especially in clearings and newly burned lands, common. July, Aug. (Eurasia.)

§ 2. LYSIMÀCHION Tausch. *Petals notched at the summit; calyx-tube prolonged a little beyond the ovary; stamens and style erect; flowers corymbed or panicled or few in the upper axils.*

a. Stigma 4-parted; petals 1–2 cm. long . . . . . 2. *E. hirsutum.*
a. Stigma entire; petals smaller *b.*
  b. Stems terete, no decurrent lines running down from the bases of the leaves; leaves entire or subentire, with revolute margins.
    Stem and pods densely covered with fine short straight spreading hairs . . . . . 3. *E. molle.*
    Stems and pods cinereous with appressed or incurved hairs, or glabrous.
      Leaves closely and evenly pubescent above; well developed plant freely branching . . . . . 4. *E. densum.*
      Leaves glabrous above, or with scattered hairs; plant simple or subsimple . . . . . 5. *E. palustre.*
  b. Stems subterete, with decurrent lines running down from the bases of the leaves; leaves toothed (rarely entire), flat, the margins not revolute.
    Stems solitary; the basal shoots (developing in late autumn) in the form of sessile or short-stalked rosettes.
      Seed abruptly contracted above; mature coma cinnamon-color; leaves elongate-lanceolate . . . . . 6. *E. coloratum.*
      Seed gradually contracted to a hyaline neck; coma whitish; leaves oblong-lanceolate to narrowly ovate . . . 7. *E. adenocaulon.*
    Stems tufted; the basal shoots quickly developing into elongate branches.
      Seed (under a microscope) smooth.
        Stems erect; flowers chiefly 3–6, the lowest in the axils of the foliage-leaves . . . . . 8. *E. alpinum.*
        Stems strongly decumbent; flowers 1 or 2 (rarely 3), essentially terminal . . . . . 9. *E. anagallidifolium.*
      Seed (under a microscope) papillose . . . . . 10. *E. Hornemanni.*

2. **E.** hirsùtum L. Tall (1–2 m. high), the much branched *stem densely covered by rather long fine straight spreading hairs;* leaves oblong, serrulate, sessile and clasping; petals magenta, showy. — In waste places and about dwellings, local, s. Me. to Ont. and s. N. Y. July–Sept. (Nat. from Eu.)

3. **E.** mólle Torr. Erect, 2–15 dm. high, simple or with few upright branches toward the summit, *stems, leaves, and pods grayish-velvety;* leaves narrowly lanceolate to linear, entire or undulate, the margins revolute; petals pink, 7–8 mm. long; seed nearly 2 mm. long, minutely papillate, coma dingy. (*E. strictum* Muhl.? as *nomen subnudum.*) — Bogs and mossy meadows, rather local, e. Que. to Athabasca, s. to Va., Ill., and Minn. July–Sept.

4. **E.** dénsum Raf. *Minutely hoary-pubescent*, 3–10 dm. high, usually much branched and very leafy, rarely stoloniferous; *leaves linear* or nearly so, revolute, acute, *canescent above (the lateral veins inconspicuous)*, erect, usually much exceeding the internodes, commonly proliferous in the axils; pedicels ¼–½ as long as the *canescent pods;* petals 3–5 mm. long, pink or white; seed 1.5 mm. long. (*E. lineare* Muhl.? as *nomen subnudum.*) — Open low grounds, e. Que. to Alb., s. to Del., W. Va., Kan., and Col. July–Sept.

5. **E. palústre** L. *Decumbent, stoloniferous*, 1–6 dm. high, the *simple or sparingly branched stem* minutely pubescent above or glabrate; *leaves thin, green*, linear- to oblong-lanceolate, subacute, *spreading-ascending*, rather remote, the middle ones 3–6 cm. long, 4–10 mm. broad; flowers few; *pedicels much shorter than the slightly pubescent or glabrate pods;* petals pink or white, 5–7 mm. long. — Bogs and wet banks, Nfd. and Lab. to Alaska, s. to n. N. E. and L. Superior. July, Aug. (Eurasia.)

Var. **labradóricum** Haussk. Dwarf, 6–15 cm. high, often freely branched; *leaves elongate-oblanceolate to linear, approximate*, with rounded tips and definite petioles, 1.5–3 cm. long, 1–4 mm. wide; *pedicels mostly as long as the pods.* — Lab. to the alpine regions of the White Mts., N. H. (Greenl.)

Var. **montícola** Haussk. Mostly simple, 1–5.5 dm. high; *leaves thick, mostly linear-oblanceolate, obtuse, strongly ascending, remote*, the middle ones 1–3 cm. long, 1.5–4 mm. wide; pedicels various. (*E. oliganthum* Michx.; *E. lineare*, var. *oliganthum* Trel.) — Bogs and wet meadows, Nfd. and Lab. to Man., s. to Mass., Pa., and the Great L. region. (Eu.)

6. **E. colorâtum** Muhl. Stem erect, not stoloniferous (often *developing in late autumn sessile or subsessile basal rosettes*), 3–9 dm. high, usually much-branched, glabrous below, canescent at least in lines above with incurved hairs; *leaves elongate-lanceolate*, 5–15 cm. long, 1–2 cm. broad, *distinctly short-petioled, closely and irregularly serrulate;* flowers abundant on the divergent branches; petals pink, 3–5 mm. long; pedicels short; *seed* 1.5 *mm. long, abruptly rounded at tip*, minutely papillate; mature *coma cinnamon-colored.* — Low ground, Me. to Neb., and southw. July–Sept.

7. **E. adenocaúlon** Haussk. Similar in habit, 1–10 dm. high; *stem* glabrous below, *minutely pubescent above with more or less incurved pale hairs, sometimes glandular or viscid; leaves oblong-lanceolate to narrowly ovate, short-petioled or subsessile, rounded or cordate at base*, less toothed than in the preceding, the middle ones 2–8 cm. long, 7–30 mm. broad; *seed about* 1 *mm. long, short-beaked*, papillate; *coma whitish.* — Rich damp soil, Nfd. to B. C., s. to Del., W. Va., Great L. region, Neb., Col., and Cal. July–Sept. Var. PERPLÉXANS Trel. *Glabrous or very sparingly pubescent above; leaves* flaccid, gradually *narrowed to the distinct petiole.* — A somewhat local extreme, e. Que. to B. C., s. to N. E., N. Y., Wisc., N. Mex., and Cal.

8. **E. alpìnum** L. Glabrous or essentially so, *tufted*, the *erect stems* 1.5–3.5 dm. high, *with elongated internodes; leaves* elliptical or the lowest obovate-spatulate, distinctly petioled, slightly repand-denticulate, *obtuse*, 1.5–4 cm. long, 7–17 mm. broad; *flowers* mostly 3–6 (rarely 12), terminal and *in the upper axils;* petals white or pinkish, 3–6 mm. long; *pedicels mostly shorter than the* green or red-tinged *pod; seed* 1.2–1.5 mm. long, *smooth.* (*E. lactiflorum* Haussk.) — Arctic Am., s. to alpine slopes and cliffs of the White Mts., N. H., Col., and Ore. June–Aug. (Eurasia.)

9. **E. anagallidifòlium** Lam. *Dwarf, the fruiting stems decumbent*, finally 5–20 cm. high, *the basal shoots wide-spreading and leafy;* leaves narrowly elliptic to oblong, obscurely petioled, subentire or remotely denticulate, obtuse, 1–1.7 cm. long, 2.5–8 mm. broad; *flowers* 1 or 2 (rarely 3), *terminal*, often nodding; petals pink, 4–6 mm. long; *pedicels* upright in fruit, mostly *equaling or exceeding the purplish pod; seed* 1.5 mm. long, *smooth.* — Arctic Am., s. in alpine districts to e. Que., Me.?, Col., and Cal. — Immature specimens from Mt. Katahdin, Me., are apparently of this species, although Haussknecht's records of its occurrence in the White Mts. and the Adirondacks have not been confirmed. July, Aug. (Eurasia.)

10. **E. Hornemánni** Reichenb. Resembling no. 8; the *upper leaves usually exceeding the internodes*, ovate and mostly *acutish*, pellucid, 2–4.5 cm. long, 7–23 mm. broad; *flowers* 2–several, *in the upper axils;* petals pink to crimson, 6–7 mm. long; *pedicels mostly shorter than the pod; seed* 1 mm. long, *papillate.* (*E. alpinum*, var. *fontanum* Wahlenb.) — Arctic Am., s. in cold and alpine situations to N. S., Me., N. H., Col., and Cal. July, Aug. — The plant from the Dells of the Wisconsin R. formerly reported as *E Hornemanni* is apparently *E. adenocaulon*, var. *perplexans.* (Eurasia.)

4. OENOTHÈRA L. Evening Primrose

Calyx-tube prolonged beyond the ovary, deciduous; the lobes 4, reflexed. Petals 4. Stamens 8; anthers mostly linear and versatile. Capsule 4-valved, many-seeded. Seeds naked or with an obscure membranaceous crest. — Leaves alternate or rarely all basal. Flowers yellow, white, or rose-color. (An old name of unknown origin, for a species of *Epilobium*.)

§ 1. ÓNAGRA (Adans.) Ser. *Stigma-lobes linear, elongated; flower-buds upright; petals yellow; fruit subcylindrical, elongated; seeds in 2 rows in each cell; caulescent annuals or biennials.* Onagra Adans.

a. Pods lance-cylindric or -prismatic, *i.e.* tapering from a thicklsh base *b.*
  b. Petals linear . . . . . 1. *O. cruciata.*
  b. Petals obovate *c.*
    c. Pods glabrous even when young . . . . . 2. *O. argillicola.*
    c. Pods more or less puhescent at least when young.
      Bracts decidedly leaf-like, *i.e.* at least the lower flowers in the axils of foliage leaves, even the upper bracts exceeding the pods.
        Sepals appendaged on the back somewhat below the tip; puhescence of the stem altogether fine and appressed . . . 8. *O. Oakesiana.*
        Sepals appendaged essentially at the tip; puhescence of the stem usually including long spreading hairs with reddish or purplish enlarged hases . . . . . 4. *O. muricata.*
      Bracts reduced and somewhat deciduous, the flowers and especially the pods in elongated exposed spikes, the upper bracts usually shorter than the pods . . . . . 5. *O. biennis.*
a. Pods more slender and of essentially uniform diameter.
  Flowers in a distinct terminal spike . . . . . 6. *O. rhombipetala.*
  Flowers in the axils of foliage leaves.
    Grayish-puhescent and somewhat silky; floral leaves mostly entire or nearly so; seed smoothish . . . . . 7. *O. humifusa.*
    Green, more loosely and sparingly puhescent; floral leaves mostly pinnatifid toward the hase; seed distinctly pitted . . . 8. *O. laciniata.*

1. **O. cruciàta** Nutt. Simple or sparingly branched, 3–8 dm. high; stem commonly reddish, smooth or somewhat strigose; stem-leaves lanceolate, remotely and shallowly dentate; sepals appendaged somewhat below the tip; *petals* very *narrow, linear*, 5–12 mm. long, 1–3 mm. wide, light yellow. (*O. biennis*, var. T. & G.; *Onagra cruciata* Small.) — Sandy or gravelly soil, centr. Me. to w. Mass. and n. N. Y.

2. **O. argillícola** Mackenzie. *Glabrous*, 5–15 dm. high; stem stoutish, very leafy; leaves linear-lanceolate, only 5–8 mm. wide, subentire or remotely and obscurely few-toothed; flowers large; calyx glabrous; petals bright yellow, broadly obovate, 3–4 cm. long; capsules crowded, mostly curved, 2–3 cm. long, glabrous, tapering to a slender summit. (*Onagra* Mackenzie.) — Mts. of Va. and W. Va.

3. **O. Oakesiàna** Robbins. Finely *puberulent, the hairs* mainly *appressed;* stem-leaves lanceolate, shallowly denticulate, 8–15 mm. broad; *sepals appendaged considerably below the tip;* petals obovate, 1.5–2 cm. long; *pods* rather large, slightly spindle-form, 3.5–4 cm. long, *appressed-puberulent.* (*O. biennis*, var. Gray; *Onagra* Britton, in part.) — Sandy fields, etc., e. Mass. to Ct.

4. **O. muricàta** L. Simple or nearly so, 2–8 dm. high, *very leafy;* stem puberulent and usually beset at least above with longer *spreading hairs on enlarged reddish tuberculate bases;* leaves lanceolate, ascending, entire or sparingly and very shallowly denticulate, passing without marked transition into the foliaceous bracts; flowers axillary, the lower much exceeded by the bracts; *sepals not prominently appendaged;* petals obovate, light yellow, 1.2–2 cm. long; capsule more or less hirsute, subfusiform-cylindric, 2.5–3 cm. long. — Sandy or gravelly shores, Nfd. and e. Que. to N. Y. Var. canéscens (T. & G.) Robinson. Hoary-pubescent or somewhat silky throughout, the tuberculate-based hairs few or none. (*O. biennis*, var. T. & G.; *Onagra strigosa* Rydb.) — From the Great Lakes to Mo., Col., and northwestw.

5. **O. biénnis** L. (Common E.) Rather stout, erect, 3–15 dm. high, usually simple, more or less spreading-pubescent to hirsute; leaves lanceolate to oblong- or rarely ovate-lanceolate, repandly denticulate, acute or acuminate; *bracts*

lanceolate, *shorter than* or scarcely exceeding the *capsules;* calyx-tube 2.5–3.5 cm. long; petals yellow, obovate, 1.5–2.5 cm. long; *pods* more or less *hirsute*, narrowed almost from the base, 2–3.5 cm. long. (*Onagra* Scop.) — Open places, common.

O. GRANDIFLÒRA Ait. (*O. biennis*, var. Lindl.; *Onagra* Cockerell), a related species of Alabama, with much larger flowers, the petals 4–6 cm. long, was formerly cultivated and has on rare occasions been found, presumably as an escape, within our range.

6. **O. rhombipétala** Nutt. Rarely branching, appressed-puberulent and subcanescent; *leaves* narrowly lanceolate, acuminate, *denticulate or subentire*, the lowest attenuate to a petiole and *rarely pinnatifid, diminishing upward* into the close elongated conspicuously bracted spike; calyx silky-canescent, the tube 2–3.5 cm. long; *petals rhombic-ovate*, 1.2–2.5 cm. long. — Ind. to Minn., Neb., and Tex.

7. **O. humifûsa** Nutt. *Hoary with short dense appressed hairs;* stems decumbent or ascending, 1.5–6 dm. long; *stem-leaves* narrowly lanceolate or oblanceolate, 1–4 cm. long, *sparingly repand-dentate or entire*, the radical leaves pinnatifid, *the floral not reduced;* petals 1.2–2.5 cm. long; capsule 2–3.5 cm. long, silky; *seeds smoothish.* — Sandy coast, N. J. to Fla.

8. **O. laciniàta** Hill. Stems ascending or decumbent, simple or branched, 1–7 dm. high, *more or less strigose-pubescent* and puberulent; *leaves* oblong or lanceolate, 2–10 cm. long, *sinuately toothed or often pinnatifid*, the floral similar; petals 5–12 mm. long; capsules 2–3 cm. long; seeds strongly pitted. (*O. sinuata* L.) — Dry open mostly sandy places, N. J. to Fla., Tex., and S. Dak. also adventive northeastw.

Var. **grandiflòra** (Wats.) Robinson. Flowers larger; the petals 2.5–4 cm. long. (*O. sinuata*, var. Wats.; *O. laciniata*, var. *grandis* Britton.) — Common in sandy fields, etc., Mo. and Kan. to Tex.

§ 2. ÁNOGRA (Spach) Endl. *Stigma-lobes linear, elongated; flowers nodding in the bud; seeds in a single row in each cell; fruit subcylindric or prismatic, elongated; caulescent perennials.* ANOGRA Spach.

9. **O. pállida** Lindl. Stems erect, 1.5–12 dm. high, commonly branched, white and often shreddy, glabrous or puberulent; leaves linear to oblong-oblanceolate, 2.5–8 cm. long, entire or repand-denticulate, or sinuate-pinnatifid toward the base; calyx-tips free in bud, throat naked; flowers axillary; petals white, turning rose-color, suborbicular, obcordate, 1.5–3 cm. long; pods 2–5 cm. long, often curved or twisted; seeds lance-linear, smooth. (*O. albicaulis* Man. ed. 6, not Nutt.; *Anogra pallida* Britton.) — Dry plains and prairies, Sask. to w. Minn., westw. and southwestw. (Mex.)

§ 3. KNEÍFFIA (Spach) Endl. *Stigma-lobes linear, elongated; flowers yellow, erect in the bud (the whole floral axis recurved in no.* 11); *fruit short, obovoid, tetragonal; seeds clustered in each cell, not in distinct rows, not crested; caulescent.* KNEIFFIA Spach.

a. Pods 4–6 mm. long; calyx-tube about 2 mm. long; stem-leaves almost filiform . . . . . 10. *O. linifolia.*
a. Pods 5–12 mm. long; calyx-tube 7–15 mm. long; stem-leaves linear to linear-oblong or ovate *b.*
  b. Pods smooth to sparingly puberulent with spreading gland-tipped hairs.
    Petals 5–10 mm. long . . . . . 11. *O. pumila.*
    Petals 1.4–3 cm. long.
      Leaves ovate, glaucous, entirely glabrous; capsule more than 9 mm. long . . . . . 12. *O. glauca.*
      Leaves lance- to linear-oblong, pubescent or at least ciliolate; capsule usually less than 9 mm. long . . . . . 13. *O. fruticosa.*
  b. Pods grayish-pubescent with fine incurved glandless hairs . . 14. *O. linearis.*
  b. Pods covered with copious widely spreading straight glandless hairs.
    Stem, pedicels, calyx, etc., finely and softly puberulent; sepals wholly connivent or their free tips very short (1 mm. long or less) . . . . . 15. *O. longipedicellata.*
    Stem, pedicels, calyx, etc., coarsely hirsute; tips of sepals free in bud, usually spreading, 2 mm. long . . . . . 16. *O. pratensis.*

10. **O. linifòlia** Nutt. Annual or biennial, erect, very slender, simple or diffuse, 1–4 dm. high, glabrous, the branchlets and capsules puberulent; *cauline leaves linear-filiform*, 1.5–4 cm. long, the radical oblanceolate; spikes loosely flowered, the bracts inconspicuous; corolla 4–6 mm. long; *stigma-lobes short; pods* obovoid to short-clavate, glandular-puberulent, 4–6 *mm. long*, not winged, nearly sessile. (*Kneiffia* Spach.) — Prairies and rocky hills, Ill. to e. Kan., Tex., and Ga.

11. **O. pùmila** L. Perennial, puberulent, 1–6 dm. high; *leaves* mostly glabrous, *entire*, obtuse or obtusish, the basal spatulate, the *cauline* narrowly *oblanceolate* to lanceolate; *spikes* loose, *at first nodding; petals* 5–10 *mm. long; pods obscurely glandular-puberulent*, clavate, 6–12 mm. long, sessile or shortly pediceled, slightly winged. (*Kneiffia* Spach.) — Open places, e. Que. to Man., s. to Wisc., O., and in the mts. to Ga.; common.

12. **O. glaúca** Michx. Perennial, erect, 5–9 dm. high, *glabrous and glaucous; leaves ovate to ovate-oblong*, 5–10 cm. long, repand-denticulate; *flowers in short leafy corymbs;* petals 2.5–3.5 cm. long; *capsule glabrous, glaucous, ovoid-ellipsoid, broadly winged*, rather abruptly contracted at base. (*Kneiffia* Spach.) — Mts., Va., Ky., and southw.

13. **O. fruticòsa** L. (Sundrops.) Perennial, erect, 3–9 dm. high, puberulent or nearly glabrous; *leaves* oblong- to linear-lanceolate, mostly denticulate, *ciliolate;* spikes short narrow-bracted, usually on naked peduncles; petals 1.4–2.6 cm. long; *capsule glabrous or sparingly glandular-puberulent*, ellipsoid to slightly clavate, winged. (*Kneiffia* Raimann.) — Dry sandy soil, s. N. E. to S. C.; also O., Mich., and Ind. Var. hirsùta Nutt. Stem spreading-pilose; the leaves also with more copious and looser pubescence. (*Kneiffia fruticosa*, var. *pilosella* Britton.) — In similar situations and extending northeastw. to centr. Me.

14. **O. lineàris** Michx. Erect, puberulent, 2–9 dm. high; leaves linear to narrowly oblanceolate, entire or nearly so, minutely puberulent; petals 1.2–3 cm. long; *capsule* clavate, 6–10 mm. long, *canescent with fine incurved glandless hairs*, on a pedicel usually as long as itself. (*Kneiffia* Spach; *O. fruticosa*, var. Wats.) — Meadows and open woods, along the coast, e. Mass. to Fla. and Ala.; also Ark. and Mo. *O. fruticosa*, var. *humifusa* Allen (*Kneiffia Alleni* Small) appears to be merely a stunted decumbent or sprawling form growing in sterile sands (L. I., etc.) and smaller in all its parts. Var. Eamèsii Robinson. Decumbent; leaves elliptical, the larger ones 2.7 cm. long, 11 mm. wide. — Sandy shore of a salt pond, Stratford, Ct. (*Eames*).

15. **O. longipedicellàta** (Small) Robinson. Perennial, erect and subsimple, 2–6 dm. high (rarely bushy-branched and sprawling), *short-hirsute; capsule* as in the preceding, but *spreading-hirsute;* the pedicels of variable length, the lowest often exceeding the fruit. (*Kneiffia* Small.) — Low ground, near the coast, Ct. to Fla.

16. **O. praténsis** (Small) Robinson. Perennial, erect or nearly so, 3–6 dm. high; *stems covered with soft long widely spreading hairs;* leaves oblong-lanceolate, 1–2 cm. broad, somewhat hirsute on both faces; lower flowers in the axils of decidedly foliaceous bracts; calyx with conspicuous caudiform free green densely hispid tips, the limb considerably shorter than the tube; petals 1.5–2.5 cm. long; *capsule* elavate, *sessile, hispid-pilose.* (*Kneiffia* Small.) — Low grounds, s. Me. to Ct.; n. w. Pa. to Ia. and Ark.

§ 4. HARTMÁNNIA (Spach) Endl. *Stigma-lobes linear; flowers white or rose-colored, nodding in bud; fruit short, obovoid to ellipsoid, 4-angled and strongly ribbed; caulescent.*

17. **O. speciòsa** Nutt. (White E.) Perennial, erect or subdecumbent, puberulent; leaves oblong-lanceolate to linear, repand-denticulate or more or less deeply sinuate-pinnatifid; petals 2.5–4 cm. long; capsule clavate-obovoid, strongly 8-ribbed, rigid, acute, stoutly pediceled. (*Hartmannia* Small.) — Prairies and plains, Mo. and Kan. to Tex., spreading eastw. into Ill., S. C., and Ga.

§ 5 LAVAÚXIA (Spach) Endl. *Stigma-lobes linear; flowers white or rose-colored; fruit ovoid, 4-winged; acaulescent.*

18. **O. tríloba** Nutt. Biennial or perennial, nearly glabrous; leaves 1–3 dm. long, somewhat ciliate, long-petioled, runcinate-pinnatifid or oblanceolate and only sinuate-toothed; calyx-tips free, the tube slender, 6–20 cm. long; petals 1.2–4 cm. long; capsule ovoid to ellipsoid, 2–3.5 cm. long, strongly winged, net-veined. (*Lavauxia* Spach.) — Shaly limestone crevices, etc., Ky. and Tenn., Assina. to Kan., Tex., and westw. (Mex.)

Var. (?) **parviflòra** Wats. Seemingly annual; flowers very small, 2.5–5 cm. long, fertilized in the bud and rarely opening fully; fruit abundant, forming at length a densely crowded hemispherical or cylindrical mass nearly 5 cm. in diameter and often 5–7 cm. high. (*Lavauxia tríloba*, var. *Watsoni* Britton.) — Plains, Kan. and Neb. — Little known.

§ 6. MEGAPTÈRIUM (Spach) Endl. *Stigma-lobes linear; flowers yellow; fruit ellipsoidal to suborbicular, broadly 4-winged; seeds in a double row in each cell, crested; caulescent.*

19. **O. missouriénsis** Sims. Decumbent, canescent-puberulent or glabrate; leaves thick, lanceolate to lance-elliptic, 5–12 cm. long, acute or acuminate, entire or repand-denticulate; calyx-tube 5–14 cm. long; petals broad, 3–6 cm. long; capsule 5–8 cm. long. (*Megapterium* Spach.) — Limestone cliffs and barrens, Mo. to Neb., Col., and southwestw.

§ 7. CALÝLOPHIS [Spach] T. & G. *Stigma disk-like, scarcely lobed; calyx-tube funnel-form with broadly dilated throat; flowers yellow; capsule linear-cylindric, elongated; suffrutescent.*

20. **O. serrulàta** Nutt. Slender, 1–5 dm. high, simple or branched, canescent on the younger parts; leaves linear to linear-lanceolate, 2–6 cm. long, subentire or shallowly denticulate; calyx-tube 6–13 mm. long, the flaring throat strongly nerved; petals broadly obovate, 8–17 mm. long, crenulate; capsule 1.8–3 cm. long. (*Meriolix* Walp.; *M. intermedia* Rydb.?) — Sandy and rocky places, Man. and w. Wisc. to Mo., and southwestw.

5. GAÚRA L.

Calyx-tube much prolonged beyond the ovary, deciduous; the lobes 4 (rarely 3), reflexed. Petals clawed, unequal or turned to the upper side. Stamens mostly 8, often turned down, as is also the long style. A small scale-like appendage before the base of each filament. Stigma 4-lobed, surrounded by a ring or cup-like border. Fruit hard and nut-like, 3–4-ribbed or -angled, indehiscent or nearly so, usually becoming 1-celled and 1–4-seeded. Seeds naked. — Leaves alternate, sessile. Flowers rose-color or white, changing to reddish in fading, in spikes or racemes, in our species quite small (so that the name, from γαῦρος, *superb*, does not seem appropriate).

* *Fruit sessile or nearly so.*

1. **G. biénnis** L. *Soft-hairy or downy*, 1–3.2 m. high; *leaves oblong-lanceolate*, denticulate; *spikes wand-like; fruit ovoid-fusiform*, 4-angled, acute at both ends, 4–6 mm. long, ribbed, downy. — Dry banks, w. Que. to Ct. (*Bishop*), Minn., Neb., and southw.; casual in e. N. E.

2. **G. parviflòra** Dougl. Soft-villous and puberulent, 1–3.6 m. high; *leaves ovate-lanceolate*, repand-denticulate, *soft-pubescent; spikes dense; fruit fusiform or clavate*, narrowed to both ends, 4-*nerved*, obtusely angled above, 6–8 mm. long. — Ia. and Neb. to Mo., La., and westw.

3. **G. coccínea** Pursh. *Canescent, puberulent or glabrate*, 1.5–4 dm. high, very leafy; *leaves lanceolate, linear-oblong or linear*, repand-denticulate or entire; flowers in simple spikes, rose-color turning to scarlet; *fruit terete below*, 4-*sided and broader above*, 4–6 mm. long. — Man. to Mo. (*Bush*), N. Mex., and westw.; introduced about Rochester, N. Y. (*M. S. Baxter, V. Dewing*)

* * *Fruit slender-pediceled.*

4. G. fílipes Spach. Nearly smooth; stem slender, 6–12 dm. high; leaves linear, mostly toothed, tapering at base; branches of the panicle very slender, naked; fruit obovoid-club-shaped, 4-angled at the summit. (*G. Michauxii* Spach.) — Open places, S. C. and Fla. to Tenn. and Okla.; also said to occur from Va. to O. and Kan., — a range in need of further confirmation.

6. STENOSÌPHON Spach.

Calyx prolonged beyond the ovary into a filiform tube. Fruit 1-celled, 1-seeded. Habit of *Gaura*. (From στενός, *narrow*, and σίφων, *a tube*.)

1. S. linifòlius (Nutt.) Britton. Slender, 6–12 dm. high, glabrous, leafy; leaves narrowly lanceolate to linear, pointed, entire, much reduced above; flowers numerous in an elongated spike, white, 1.2 cm. long; fruit pubescent, ovoid, 8-ribbed, 2.5–3 mm. long. (*S. virgatus* Spach.) — Gravelly hills and dry prairies, e. Kan. to Col. and Tex.

7. TRÀPA L. Water Nut. Water Caltrop

Calyx-tube short, inclosing the base of the ovary; limb 4-parted, the segments persistent and becoming spinescent. Fruit indehiscent, large, with 2–4 strong spines, 1-celled, 1-seeded. — Aquatic plants, with opposite or whorled leaves, the upper crowded, with inflated petioles, rhombic, coarsely toothed, the submersed remote, with capillary segments; flowers borne among the floating leaves. (Name abridged from *calcitrapa*, a caltrop, in allusion to the spreading points of the fruit.)

1. T. nàtans L. (Water Chestnut.) Fruit 4-horned; seed edible. — Quiet streams and ponds, Middlesex Co., Mass.; Schenectady Co., N. Y. (Introd. from Eurasia.)

8. CIRCAÈA [Tourn.] L. Enchanter's Nightshade

Calyx-tube slightly prolonged, the end filled by a cup-shaped disk, deciduous; lobes 2, reflexed. Fruit indehiscent, small and bur-like, bristly with hooked hairs, 1–2-celled; cells 1-seeded. — Low perennials, with opposite leaves on slender petioles, and small whitish flowers in racemes, produced in summer. (Named for *Circe*, the enchantress.)

1. C. lutetiàna L. Tall (3–9 dm. high); *leaves* ovate, tending to ovate-oblong, mostly *rounded at the base*, of rather firm texture, slightly toothed; *bracts none;* hairs of the *roundish pyriform 2-celled fruit* bristle-like (rarely wanting). — Common in dry open woods, N. S. to Ont., and southw. (Eu.)

2. C. intermèdia Ehrh. Lower, 2–4 dm. high; *leaves* thin, ovate, the middle and upper more or less *cordate*, the *teeth salient; minute bracts usually present;* petals as long as the calyx; fruit nearly as in the preceding. — Deep shade, e. Que. to Ont., Ia., and Tenn. (Eu.) — Not always well marked.

3. C. alpina L. *Low* (7–20 cm. high), *smooth, weak; leaves heart-shaped, thin, shining, coarsely toothed; bracts minute;* petals usually shorter than the calyx; hairs of the obovoid *1-celled fruit* soft and slender. — Deep woods, Lab. to Alaska, s. to Ga., Ind., Mich., n. e. Ia., and S. Dak. (Eu.)

HALORAGIDÀCEAE (Water Milfoil Family)

Aquatic or marsh plants (*at least in northern countries*), *with the inconspicuous symmetrical* (perfect or unisexual) *flowers sessile in the axils of leaves or bracts, calyx-tube adherent to the ovary, which consists of* 2–4 *more or less united carpels* (or in *Hippuris* of only one carpel), *the styles or sessile stigmas distinct.* Limb of the calyx obsolete or very short in fertile flowers.

Petals small or none. Stamens 1–8. Fruit indehiscent, 1–4-celled, with a single anatropous seed suspended from the summit of each cell. Embryo in the axis of fleshy albumen; cotyledons minute.

1. **Myriophyllum.** Flowers monoecious or polygamous, the parts in fours, with or without petals. Stamens 4 or 8. Leaves often whorled, the immersed commonly pinnately dissected.
2. **Proserpinaca.** Flowers perfect, the parts in threes. Petals none. Leaves alternate, the immersed pinnately dissected.
3. **Hippuris.** Flowers apetalous. Stamen and style only one. Leaves entire, whorled.

1. MYRIOPHÝLLUM [Vaill.] L. Water Milfoil

Flowers monoecious or polygamous. Calyx of the sterile flowers 4-parted, or the fertile 4-toothed. Petals 4, or none. Stamens 4–8. Fruit nut-like, 4-celled, deeply 4-lobed; stigmas 4, recurved. — Perennial aquatics. Leaves crowded, often whorled; those under water pinnately parted into capillary divisions. Flowers sessile in the axils of the upper leaves, usually above water, in summer; the uppermost staminate. (Name from *μύριοι, numberless*, and *φύλλον, a leaf*, alluding, like Milfoil, to the innumerable divisions of the leaves.)

a. Flowering stems leafy; foliage leaves pectinate *b.*
  b. Flowers in terminal naked spikes or in the axils of greatly reduced or modified leaves *c.*
    c. Leaves in definite whorls *d.*
      d. Leaves 5–12 mm. long; flowers chiefly 1 or 2 at each node of the spike . . . . . 1. *M. alterniflorum.*
      d. Leaves chiefly longer; flowers numerous, in remote verticels *e.*
        e. Verticels apparently naked, the floral leaves shorter than or only slightly exceeding the flowers.
          Rhachis and segments of the foliage leaves capillary and of uniform diameter; floral leaves entire or merely dentate . 2. *M. spicatum.*
          Rhachis flattish and somewhat broader than the segments of the foliage leaves; floral leaves pectinate . (3) *M. verticillatum*, v. *pectinatum.*
        e. Verticels subtended by elongate floral leaves *f.*
          f. Petals quickly deciduous; stamens 8; carpels plump and rounded on the back . . . . . 3. *M. verticillatum.*
          f. Petals tardily deciduous; stamens 4; carpels 1–2-ridged or -angled on the back.
            Floral leaves ovate to oblanceolate; carpels papillose-roughened . . . . . 4. *M. heterophyllum.*
            Floral leaves linear or linear-lanceolate; carpels smooth . 5. *M. hippuroides.*
    c. Leaves variously arranged (verticillate, falsely verticillate, opposite, or alternate) on the same plant.
      Carpels with flat sides and tuberculate-ridged back . . . . 6. *M. scabratum.*
      Carpels plump, smooth or minutely papillose . . . . . 8. *M. humile.*
  b. Flowers in the axils of unmodified foliage leaves.
    Carpels smooth or barely papillose, plump, not ridged on the back . 8. *M. humile.*
    Carpels with flat sides and prominent tuberculate dorsal ridges.
      Fruit 2–2.5 mm. long . . . . . 7. *M. Farwellii.*
      Fruit 1–1.5 mm. long . . . . . 6. *M. scabratum.*
a. Flowering stems naked or with few scattered filiform uncleft leaves . 9. *M. tenellum.*

§ 1. PENTÁPTERIS DC. *Stamens* 8; *petals early deciduous; leaves whorled.*

* *Floral leaves (bracts) scattered; flowers rarely in verticels.*

1. **M. alterniflòrum** DC. Very slender; *leaves* 5–12 *mm. long*, the rhachis and segments capillary; *flowers solitary or in pairs*, in simple or branched nearly naked spikes; lowermost *bracts* pectinate, the others *entire or nearly so, shorter than the flowers.* — Ponds and slow streams, Nfd. to Ont., s. to Middlesex Co., Mass., and L. Champlain, Vt. (Greenl., Eu.)

** *Floral leaves and flowers in verticels.*

2. **M. spicàtum** L. *Leaves* somewhat *rigid*, 1–3 *cm. long, the rhachis and capillary segments of uniform diameter;* flowers verticillate, in an interrupted *apparently naked spike; the bracts* shorter than or slightly exceeding the flowers, *entire or merely dentate; stigmas* roundish, closely *sessile*, not elongated; sepals

of the staminate flowers deep purplish; fruit globose, 4-furrowed, 2–3 mm. long. — Brackish or fresh pools or slow streams, Nfd. to Alaska, s. to Ct., Great L. region, Kan., N. Mex., Ariz., and s. Cal. (Eurasia.)

3. **M. verticillàtum** L. *Leaves flaccid*, 1.5–4 *cm. long, the flattish rhachis somewhat broader than the linear-filiform segments; floral leaves* or bracts similar but firmer, 6–20 *mm. long*, uniform or nearly so, *all much exceeding the flowers; stigmas* somewhat *elongate*, recurved; sepals of the staminate flowers pale green to pinkish; fruit subglobose, the 4 carpels plump, 2.5–3 mm. long. — The typical European plant, rare or local with us; examined only from w. N. Y. and Ill. Represented in America chiefly by

Var. **pectinàtum** Wallr. Spike appearing naked or nearly so, much as in *M. spicatum*, all or most of the *pectinate bracts* shorter than or only slightly exceeding the flowers. — Fresh or brackish pools, Gaspé Co., Que., to Sask. and B. C., s. to n. Me., L. Memphremagog, Que., centr. and w. N. Y., Great L. region, Minn., and Utah. (Eurasia.)

§ 2. **TESSARÒNIA** Schindler. *Stamens* 4; *petals rather persistent.*

* *Carpels* 1–2-*ridged on the back.*

← *Flowers on emersed spikes, the floral leaves chiefly modified.*

4. **M. heterophýllum** Michx. *Stem stout* (the base of the spike 2–5 mm thick); leaves whorled in 4's, 5's, or 6's, the submersed 1.5–5 cm. long, the flattened rhachis slightly broader than the linear-filiform segments; spikes 1–3 dm. long; *floral leaves whorled, crowded, ovate to oblanceolate, entire or denticulate, thickish*, 4–16 mm. long; *fruit* 1–1.5 *mm. long, about as thick, papillose-roughened, the carpels* 2-ridged on the back, *convex on the sides*, their styles prominent. — Ponds and slow streams, near the coast, Va. to Fla.; also from w. N. Y. and Ont. to Minn., s. to Mo. and Tex.

5. **M. hippuroìdes** Nutt. Similar, more *slender; floral leaves linear to linear-lanceolate*, entire to pectinate; *fruit* 2 *mm. long*, about 1 *mm. thick, the smoothish carpels flattish on the sides*, their styles very short. — Apparently local, s. Ont.; also from Wash. to Cal.

6. **M. scabràtum** Michx. Slender; *leaves variously arranged*, verticillate, subverticillate, or scattered, on the same plant, the submersed with linear-capillary segments; *the emersed and the floral leaves linear, pectinate-toothed or cut-serrate;* fruit 1–1.5 mm. long, about as broad, the *carpels with flat sides and* 2 *tuberculate ridges on the back.* (*M. pinnatum* BSP., at least in part; possibly *Potamogeton pinnatum* Walt.) — Shallow ponds and muddy shores, e. Mass. to S. C., near the coast; also from w. Ky. and w. Tenn. to Ia. and Tex.

← ← *Flowers in the axils of unmodified submersed leaves.*

7. **M. Farwéllii** Morong. Slender, flowering below the surface of the water; leaves all divided into filiform segments, subverticillate or scattered; flowers solitary in the middle axils; fruit 2–2.5 mm. long, somewhat narrower, the flat-sided carpels with prominently tuberculate dorsal ridges. — Ponds and slow streams, Gaspé Co., Que., to n. Mich., s. to s. Me., s. N. H., s. Vt., and centr. N. Y.

** *Carpels rounded and even on the back; leaves chiefly scattered, or wanting on the flowering stems.*

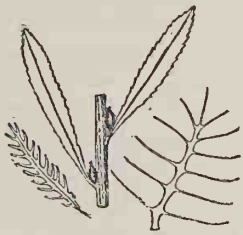
8. **M. hùmile** (Raf.) Morong. *Stems* slender, 5–15 cm. high, erect or decumbent, *rooting in the mud; leaves subopposite or alternate, the lower* 4–8 *mm. long, pinnately divided;* floral leaves similar or linear and serrate or entire; *flowers mostly perfect;* fruit 0.7 mm. long, the subcylindric carpels smooth or minutely papillose. (*M. ambiguum*, var. *limosum* Nutt.) — Muddy shores and shallow pools, centr. Me. to Vt., s. to Md.; reported from Ind. and Ill. to Tenn. and Mo. Forma NÀTANS (DC.) Fernald. Stems elongate and partly submersed; foliage leaves crowded, sometimes verticillate, larger, with long capillary divisions; spikes emersed; floral leaves as in the typical form. (*M. ambiguum* Nutt.) — Shallow ponds and slow streams. Forma CAPILLÀCEUM (Torr.) Fer-

nald. Stems elongate, completely submersed; flowers in the axils of elongate capillary-divided leaves. (*M. ambiguum*, var. *capillaceum* T. & G.) — Ponds and streams.

9. **M. tenéllum** Bigel. *Flowering stems nearly leafless and scape-like*, 7–35 cm. high, erect, simple; the sterile shoots creeping and tufted; leaves filiform, undivided; bracts small, entire; *flowers alternate, monoecious;* fruit smooth. — Borders of ponds and streams, Nfd. to Ont., s. to N. J., Pa., and Mich.

2. PROSERPINÀCA L. Mermaid-weed

Flowers perfect. Calyx-tube 3-sided, the limb 3-parted. Petals none. Stamens 3. Stigmas 3, cylindrical. Fruit bony, 3-angled, 3-celled, 3-seeded, nut-like. — Low perennial herbs, with the stems creeping at base, alternate leaves, and small flowers sessile in the axils, solitary or 3–4 together, in summer. (Name applied by Pliny to a *Polygonum*, meaning *pertaining to Proserpine.*)



813. P. palustris × ⅔.

1. **P. palústris** L. *Fertile leaves* (those with flowers or fruit in their axils) *lanceolate*, sharply serrate, the sterile (often occurring above as well as below the fertile) usually pectinate. — Muddy borders of ponds or in shallow water, N. B. to Fla., Tex., and Minn. Fig. 813.

2. **P. pectinàta** Lam. *Leaves uniform, both fertile and sterile divided to the rhachis;* the divisions slightly rigid, linear-awl-shaped. — Sandy swamps, near the coast, s. Me. to Fla. and La., local. Fig. 814.

814. P. pectinata × ⅔.

3. HIPPÙRIS L. Mare's-tail

Flowers perfect or polygamous. Calyx entire. Style thread-shaped, stigmatic down one side, received in the groove between the lobes of the large anther. Fruit nut-like, 1-celled, 1-seeded. — Perennial aquatics, with simple entire leaves in whorls, and minute flowers sessile in the axils, in summer. (Name from ἵππος, *a horse*, and οὐρά, *a tail.*)

1. **H. vulgàris** L. Stems simple, 1.5–6 dm. high; leaves in whorls of 6–12, linear, acute; fruit nearly 2 mm. long. — Ponds and streams, Lab. to Alaska, s. to N. S., Me., Vt., N. Y., Ind., Ill., Minn., Neb., and N. Mex. (Eu.)

ARALIÀCEAE (Ginseng Family)

Herbs, shrubs, or trees with much the same characters as Umbelliferae, *but with usually more than 2 styles, and the fruit a few-several-celled drupe.* Albumen mostly fleshy. Petals 5, epigynous, not inflexed. Stamens 5, epigynous, alternate with the petals.

* Leaves compound.

1. **Aralia.** Leaves alternate, compound, the ultimate divisions pinnate. Carpels 5; fruit black.
2. **Panax.** Leaves whorled, palmately 3–7-foliolate. Carpels 2–3; fruit red or yellow.

** Leaves simple but palmately lobed.

3. **Fatsia.** Leaves orbicular, cordate, palmately lobed, scattered. Carpels 2; fruit red, 2-seeded.

1. ARÀLIA [Tourn.] L.

Flowers polygamous. Petals slightly imbricated in the bud. Ovary 5-celled; ovules solitary, anatropous, suspended in the cells. — Leaves compound or decompound. Flowers white or green, in umbels or panicles. Qualities aromatic. (Derivation obscure.)

* *Umbels numerous in a large compound panicle; leaves very large, decompound.*

1. A. spinòsa L. (Angelica-tree, Hercules' Club.) *Shrub, or a low tree; the stout stem and stalks prickly;* leaflets ovate, pointed, serrate, pale beneath. — River-banks, s. N. Y. to Mo., and southw. July, Aug.

2. A. racemòsa L. (Spikenard.) *Herbaceous; stem widely branched; leaflets heart-ovate,* pointed, doubly serrate, slightly downy; umbels racemose; *styles united.* — Rich woodlands. July. — Well known for its spicy-aromatic large roots.

* * *Umbels mostly 2–7, corymbed; stem short, somewhat woody.*

3. A. híspida Vent. (Bristly Sarsaparilla, Wild Elder.) *Stem* 4–9 dm. high, *bristly, leafy,* terminating in a peduncle bearing several umbels; leaves twice pinnate; leaflets oblong-ovate, acute, cut-serrate. — Rocky and sandy places, Nfd. to Hudson Bay, s. to N. C., W. Va., Ind., Mich., and Minn. June, July.

4. A. nudicaúlis L. (Wild Sarsaparilla.) *Stem scarcely rising out of the ground, smooth, bearing a single long-stalked leaf* (2–4 dm. high) *and a shorter naked scape,* with 2–7 umbels; leaflets oblong-ovate or oval, pointed, serrate, 5 on each of the 3 divisions. — Moist woodlands; Nfd. to Ga., Col., and Ida. May, June. — The long horizontal aromatic roots a substitute for officinal Sarsaparilla. Var. elongàta Nash, from the Catskill Mts., has been distinguished because of its somewhat longer narrower leaflets (13–15 cm. long, 4 cm. wide), which are paler beneath. Var. prolífera Apgar, of w. N. J., has more divided leaves with 25–40 leaflets and proliferous inflorescence with 5–70 umbellets.

2. PÀNAX L. Ginseng

Flowers dioeciously polygamous. Umbel solitary, simple, terminal. Carpels 2–3. — Herbaceous perennials, springing from thickish roots or tubers, the erect simple stems bearing a solitary whorl of 3 palmate leaves. (Name from πᾶς, *all,* and ἄκος, *cure,* that is, *all-healing,* a panacea.) Often included in *Aralia.*

1. P. quinquefòlium L. (Ginseng.) *Root large and spindle-shaped, often forked,* 1–2 dm. long, aromatic; stem 3 dm. high; *leaflets long-stalked,* mostly 5, large and thin, obovate-oblong, pointed; styles mostly 2; *fruit bright red.* (*Aralia* Dcne. & Planch.) — Rich and cool woods, Que. and Ont., s. to N. E., N. Y., Great L. region, e. Ia., Mo., and along the mts. to Ga. July. — Much sought for the root, which is purchased by the Chinese and extensively employed by them in their medicine, as is also the even more highly prized Asiatic *P. ginseng* C. A. Mey.

2. P. trifòlium L. (Dwarf G., Ground-nut.) *Root or tuber globular,* deep in the ground; stem 1–2 dm. high; *leaflets* 3–5, *sessile* at the summit of the leaf-stalk, narrowly oblong, obtuse; styles usually 3; *fruit yellowish.* (*Aralia* Dcne. & Planch.) — Rich woods, N. S. to w. Ont., s. to Del., Md., Ill., Ia., and along the mts. to Ga. Apr., May.

3. FÁTSIA Dcne. & Planch.

Flowers perfect or polygamous. Umbels numerous in simple or compound racemes or paniculately disposed. Calyx-margin narrow or obsolete, obscurely crenate-lobed. Carpels (in ours) 2. — Stout sometimes arborescent shrubs, ours very prickly. Leaves simple, long-petioled, the limb suborbicular, palmately lobed. (Name from the Japanese vernacular designation of one of the species.) Echinopanax Dcne. & Planch. Oplopanax Miquel.

1. F. hórrida (Sm.) B. & H. (Devil's Club.) Coarse shrub, thickly beset with stramineous prickles; leaves 1–3 dm. in diameter, with 5–13 deltoid acute lobes, the margin sharply and unevenly serrate, the ribs prickly beneath. (*Echinopanax* Dcne. & Planch.) — Rocky cliffs, etc., Isle Royale, L. Superior (*W. A. Wheeler*); and from the Rocky Mts. to Cal. and s. Alaska. (Japan.)

UMBELLÍFERAE (Parsley Family)

Herbs, with small flowers in umbels (or rarely heads), the calyx entire or 5-toothed, the tube wholly adhering to the 2-celled and 2-ovuled ovary, the 5 petals and 5 stamens inserted on the disk that crowns the ovary and surrounds the base of the 2 styles. Fruit of 2 seed-like dry carpels (called *mericarps*) cohering by their inner face (the *commissure*), when ripe separating from each other and usually suspended from the summit of a slender prolongation of the axis (*carpophore*); each carpel marked lengthwise with 5 *primary ribs*, and often with 4 intermediate (*secondary*) ones; in the *interstices* or *intervals* are commonly oil-tubes (*vittae*), longitudinal canals containing aromatic oil. (These are best seen in slices made across the fruit.) Seed suspended from the summit of the cell, anatropous. Stems usually hollow. Leaves alternate, mostly compound, the petioles expanded or sheathing at base. Umbels usually compound, the secondary ones being termed *umbellets;* the bracts which often subtend the general umbel form the *involucre*, and those of the umbellets the *involucels*. The frequently thickened base of the styles is called the *stylopodium*. — A large and difficult family, some of the species innocent and aromatic, others with very poisonous properties.

N. B. — In this family the figures represent the mature fruit entire and in cross section.

I. Fruit with primary ribs only, hence 3 dorsal ones on each carpel (these sometimes obscure or obsolete in the first group.)

* Fruit ovoid, obovoid, or globose, not ribbed, scaly or densely covered with hooked prickles.

1. **Eryngium.** Flowers sessile in dense bracteate heads, white or blue. Leaves mostly rigid, more or less spinose.
2. **Sanicula.** Flowers in irregular compound few-rayed umbels, yellow or green. Leaves palmate.

[**Spermolepis** may be sought here.]

* * Fruit flattened laterally.

+ Carpels also strongly flattened laterally.

++ Seed straight, not sulcate; umbels simple (often proliferous.)

3. **Hydrocotyle.** Fruit suborbicular; carpels with 3 dorsal ribs, not reticulated. Petals small, somewhat tubular. Low perennials in or near water. Leaves simple, roundish.
4. **Centella.** Fruit orbicular; carpels with 5 dorsal ribs, and somewhat reticulated. Petals flat. Leaves ovate.

++ ++ Seed lunate, deeply sulcate on the face; umbels compound, leafy-bracted.

5. **Erigenia.** Fruit nearly orbicular, with numerous oil-tubes. Low, nearly acaulescent from a deep-seated tuber. Leaves ternately decompound.

+ + Carpels terete or slightly flattened laterally; petals white (greenish-yellow in *Petroselinum*).

++ Seed-face concave; fruit linear-oblong (rarely broader), with usually conical stylopodium.

6. **Chaerophyllum.** Fruit glabrous, with small mostly solitary oil-tubes.
7. **Osmorhiza.** Fruit bristly, the oil-tubes obsolete.

++ ++ Seed-face concave; fruit ovate; leaves finely divided.

8. **Spermolepis.** Fruit warty or bristly, the ribs obsolete. Slender annuals.
9. **Conium.** Fruit smooth, with conspicuous often undulate ribs. Ours biennial.

++ ++ ++ Seed-face flat.

= Leaves finely dissected; oil-tubes solitary; very slender annuals.

10. **Ptilimnium.** Dorsal ribs filiform, the lateral very thick and corky.

= = Leaves decompound; oil-tubes solitary or none; perennials.

11. **Aegopodium.** Ribs equal, filiform. Oil-tubes none; stylopodium conical. Leaves biternate
12. **Cicuta.** Ribs flattish, corky, the lateral largest. Marsh plants.
13. **Carum.** Ribs filiform, inconspicuous; stylopodium short-conical. Leaf-segments filiform. Petals white or roseate.
14. **Petroselinum.** Ribs filiform, inconspicuous; stylopodium short-conical. Leaf-segments incised. Petals greenish-yellow.

= = = Leaves once pinnate; oil-tubes 6–many; stylopodium depressed; aquatic perennials.

15. **Berula.** Fruit nearly globose; ribs inconspicuous; pericarp thick and corky.
16. **Sium.** Fruit ovate to oblong; ribs prominent, corky, nearly equal.

= = = = Leaves 3-foliolate; stylopodium conical; oil-tubes solitary, beneath and between the ribs

17. **Cryptotaenia.** Ribs obtuse, equal; fruit linear-oblong, glabrous.

+ + + Carpels terete or slightly flattened laterally; petals golden yellow.

18. **Zizia.** Fruit ovate to oblong; ribs filiform; stylopodium none; seed terete.

+ + + + Carpels depressed dorsally; fruit short.

++ Seed-face flat or nearly so; petals mostly yellow.

19. **Foeniculum.** Ribs prominent; oil-tubes solitary. Leaves filiform-dissected.
20. **Pimpinella.** Ribs filiform; oil-tubes numerous; stylopodium depressed-conical. Leaves pinnate. Petals white.
21. **Taenidia.** Ribs filiform; oil-tubes numerous; stylopodium none. Leaves palmately compound. Petals yellow.

++ ++ Seed-face decidedly concave; petals white (except in *Bupleurum*).

= Leaves compound.

a. Fruit beakless; oil-tubes numerous.

22. **Eulophus.** Stylopodium conical. Glabrous perennials from fascicled tubers. Leaves pinnately compound.

b. Fruit (in ours) conspicuously beaked; oil-tubes solitary in the intervals or none; leaves 2–3-ternately or -pinnately divided.

23. **Anthriscus.** Beak not more than one third to one half as long as the body of the fruit, smooth.
24. **Scandix.** Beak much exceeding the body of the fruit, its margins upwardly hispid.

= = Leaves entire.

25. **Bupleurum.** Fruit oblong, with slender ribs, no oil-tubes, and prominent flat stylopodium. Leaves simple, perfoliate.

* * * Fruit not flattened either way or but slightly, neither prickly nor scaly.

+ Dorsal ribs filiform, the lateral very thick and corky; oil-tubes solitary.

26. **Lilaeopsis.** Small glabrous creeping perennials, rooting in the mud, with small simple umbels and leaves reduced to hollow cylindrical jointed petioles.
27. **Cynosciadium.** Annuals with compound leaves and compound umbels.

+ + Ribs all prominent and equal but not winged; flowers white or roseate.

++ Ribs acutish or rounded, narrower than the intervals between them.

28. **Ligusticum.** Stontish perennials. Leaves 2–4-ternate; leaflets ovate, obovate, or oblong.
29. **Coriandrum.** Slender annuals. Cauline leaves cleft or dissected into linear segments.

++ ++ Ribs thickish and corky, broader than the intervals.

30. **Aethusa.** Slender annual with finely divided leaves. Oil-tubes solitary in the intervals, 2 on the commissure.
31. **Coelopleurum.** Stout maritime perennial. Oil-tubes under the ribs as well as in the intervals, 2–4 on the commissure.

+ + + Ribs all conspicuously winged; stylopodium depressed or wanting; perennials.

32. **Cymopterus.** Low and glabrous, mostly cespitose, with pinnately compound leaves and white flowers. Oil-tubes 1–several. Western.
33. **Thaspium.** Tall, with ternately divided or simple leaves, and yellow flowers (rarely purple). Oil-tubes solitary in the intervals, 2 on the commissure.

* * * * Fruit strongly flattened dorsally, the lateral ribs prominently winged.

+ Acaulescent or nearly so, with filiform dorsal ribs, thin coherent wings, and no stylopodium.

34. **Lomatium.** Fruit orbicular to oblong, oil-tubes 1–4 in the intervals, 2–6 on the commissure.

+ + Caulescent branching plants, with depressed stylopodium and yellow petals (these unknown in no. 35).

++ Leaflets entire.

35. **Pseudotaenidia.** Fruit lance-oblong; lateral wings connivent, somewhat corky; stylopodium obscure; oil-tubes solitary in the intervals or double in the lateral intervals.

++ ++ Leaflets serrate or incised.

= Involucre none.

36. **Polytaenia.** Fruit with thick corky margin, obscure ribs, and very numerous oil-tubes.

37. **Pastinaca.** Fruit with filiform dorsal ribs, thin wings, and solitary oil-tubes.

= = Involucre conspicuous, of several lanceolate deflexed bracts.

38. **Levisticum.** Fruit strongly ribbed; oil-tubes solitary.

++ ++ ++ Leaves decompound, their divisions dissected into linear-filiform segments.

39. **Anethum.** Fruit elliptical, rounded at each end; dorsal ribs thin and sharp, the lateral with distinct narrow wings.

+ + + Caulescent branching plants, with petals white or nearly so.

++ Lateral wings closely contiguous; oil-tubes solitary; stylopodium thick-conical.

= Oil-tubes conspicuous, obclavate, extending only one half or two thirds the way to the base of the fruit.

40. **Heracleum.** Dorsal ribs filiform, the broad wings with a marginal nerve. Petals conspicuous. Tall stout pubescent perennials, with ternate or pinnate leaves and large incised and toothed leaflets.

= = Oil-tubes of more uniform diameter, extending essentially to the base of the fruit.

41. **Imperatoria.** Leaves ternately compound; leaflets broad, ovate to obovate, serrate and incised. Stout, terrestrial.

42. **Oxypolis.** Dorsal ribs apparently 5, filiform. Leaves pinnate or reduced to hollow cylindrical petioles. Glabrous swamp plants.

++ ++ Lateral wings distinct; oil-tubes usually more than one in each interval.

43. **Conioselinum.** Stylopodium slightly conical. Dorsal ribs prominent. Tall slender glabrous perennial, with thin finely and pinnately compound leaves.

44. **Angelica.** Stylopodium mostly depressed, but the disk prominent and crenulate. Dorsal ribs strong. Stout perennials, with coarse 2–3-ternately or -pinnately divided leaves.

II. Fruit with secondary ribs the most prominent, winged and armed with barbed or hooked prickles, the primary ribs filiform and bristly.

45. **Torilis.** Calyx-teeth prominent. Fruit flattened laterally. Seed-face deeply sulcate.

46. **Daucus.** Calyx-teeth obsolete. Fruit flattened dorsally. Seed-face flat.

1. ERÝNGIUM [Tourn.] L. Eryngo

Calyx-teeth prominent, rigid and persistent. Styles slender. Fruit ovate or obovate, covered with little hyaline scales or tubercles, with no ribs, and usually 5 slender oil-tubes on each carpel. — Chiefly perennials, with coriaceous, toothed, cut, or prickly leaves, and blue or white bracted flowers closely sessile in dense heads. (A name used by Dioscorides, of uncertain origin.)

* *Stout, with parallel-veined elongated linear thick leaves.*

1. **E. yuccifòlium** Michx. (Rattlesnake Master, Button Snakeroot.) Branching above, 0.5–1.7 m. high; leaves rigid, tapering to a point, the lower 4–9 dm. long, the margins remotely bristly; heads ovoid-globose, 1.8 cm. long, with ovate-lanceolate mostly entire cuspidate-tipped bracts shorter than the

head, and similar bractlets. (*E. aquaticum* L. 1762, in part, not L. 1753.) — Ct. to Minn., Kan., Tex., and Fla. July–Sept.

** *Tall and often stout; leaves thick, not parallel-veined.*

2. **E. aquáticum** L. *Slender*, 3–9 dm. high; *radical and lower stem-leaves linear- to oblong-lanceolate, on long* (sometimes 3 dm.) *fistulous petioles*, entire or with small hooked teeth; upper leaves sessile, spiny-toothed or laciniate; heads ovoid-ellipsoid, 1.2 cm. long, with reflexed bracts, and *bractlets with* 3 *spiny cusps* (the middle one largest). (*E. virginianum* Lam.) — By ponds and streams, N. J. to Fla. and Tex., near the coast. Aug., Sept.

3. **E. Leavenwórthii** T. & G. Stout, 4–9 dm. high; *lowest stem-leaves broadly oblanceolate, spinosely toothed, the rest* sessile and *deeply and palmately parted into narrow incisely pinnatifid spreading pungent segments;* heads ovoid-ellipsoid, 2.5–4 cm. long, with pinnatifid spinose bracts and 3–7-cuspidate bractlets, the terminal ones very prominent and resembling the bracts. — Dry soil, e. Kan., Ark., and Tex.

*** *Prostrate and slender, rooting at the joints, diffusely branched, with small thin unarmed leaves and very small heads.*

4. **E. prostràtum** Nutt. Lower leaves oblong, entire, few-toothed, or lobed at base; upper leaves smaller, clustered at the rooting joints, ovate, few-toothed or entire (occasionally some additional trifid ones); reflexed bracts longer than the eliipsoid heads (4–7 mm. long). — Wet places, s. Mo. to Fla. and Tex.

2. SANÍCULA [Tourn.] L. Sanicle. Black Snakeroot

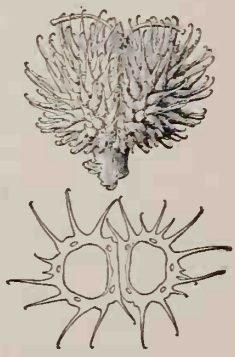
Calyx-teeth manifest, persistent. Fruit globular; the carpels not separating spontaneously, ribless, thickly clothed with hooked prickles. — Perennial rather tall glabrous herbs, with few palmately lobed or parted leaves, those from the base long-petioled. Umbels irregular or compound, the flowers (greenish or yellowish) capitate in the umbellets, perfect, and with staminate ones intermixed. Involucre and involucels few-leaved. (Name said to be from *sanare*, to heal; or perhaps from *San Nicolas*.)

815. S. marilandica × 2.

* *Styles much exceeding the bristles of the fruit, recurved.*

1. **S. marilándica** L. Stem erect, 3–10 dm. high; leaves 5–7-parted, the divisions sharply serrate, acute; sterile flowers pedicellate, often in separate umbels; *fruit* 6–7 *mm. long, sessile.* — Nfd. to Ga. and w. to the Rocky Mts., common. Fig. 815.

2. **S. gregària** Bicknell. Stem slender, 6 dm. high; leaves 5-foliolate; leaflets obovate, cleft and serrate; *fruit only* 3–4 (–5) *mm. long*, somewhat *stipitate.* — Rich woods, St. John Valley, N. B.; s. N. H. to Minn., Ark., and Ga. Fig. 816.



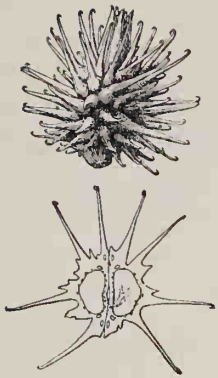
816. S. gregaria × 4.

** *Styles shorter than the bristles.*

817. S. canadensis × 4.

3. **S. canadénsis** L. Simple, erect, 5–8 dm. high; leaves 3–5-foliolate, leaflets narrowly obovate, sharply serrate; *sterile flowers* few, *short-pediceled; fruit* nearly sessile, *subglobose*, 3–6 mm. long. — N. H. to Fla., Minn., Neb., and Tex., common. Fig. 817.

4. **S. trifoliàta** Bicknell. Similar in habit, the leaflets



818. S. trifoliata × 2⅔.

broader; *sterile flowers on long* slender *pedicels; fruit* ovoid or at maturity somewhat *fusiform*, tipped with the conspicuous beak-like calyx. — Rich soil, Kennebec Valley, Me. (*Scribner*); and from the Ct. Valley to Ont., Minn., and W. Va. Fig. 818.

3. HYDROCÓTYLE [Tourn.] L. Water Pennywort

Calyx-teeth obsolete. Carpels with 2 of the ribs enlarged and often forming a thickened margin; oil-tubes none, but usually a conspicuous oil-bearing layer beneath the epidermis. — Low mostly smooth marsh or aquatic perennials, with slender creeping stems, round shield-shaped or kidney-form leaves, and scale-like stipules. Flowers small, white, in simple umbels or clusters, which are either single or proliferous (one above another), appearing all summer. (Name from ὕδωρ, *water*, and κοτύλη, *a flat cup*, the peltate leaves of several species being somewhat cup-shaped.)

* *Pericarp thin except at the broad corky dorsal and lateral ribs; leaves round, peltate, crenate; peduncles as long as the petioles, from creeping rootstocks.*

+ *Fruit notched at base and apex; intermediate ribs corky.*

1. **H. umbellàta** L. *Umbels many-flowered, simple* (sometimes proliferous); *pedicels 4–12 mm. long; fruit about 3 mm. broad*, strongly notched, the dorsal ribs prominent but obtuse. — Mass. to Fla. and Tex., chiefly on the coastal plain; also Mich. and Ind., and reported from Minn.

2. **H. Cánbyi** Coult. & Rose. *Umbels 3–9-flowered, generally proliferous; pedicels very short*, but distinct; *fruit 3–3.5 mm. broad;* carpels broader and more flattened than in the preceding, sharper-margined, the dorsal and lateral ribs much more prominent; seed-section much narrower. — N. J. to Md.

+ + *Fruit not notched; intermediate ribs not corky.*

3. **H. verticillàta** Thunb. Umbels few-flowered, proliferous, forming an interrupted spike; pedicels very short or none; *fruit* 3–4 mm. broad, *subsessile;* dorsal and lateral ribs very prominent. — Mass. to Fla., Ark., and Tex.

4. **H. austràlis** Coult. & Rose. Very like the preceding; *flowers pediceled.* — Dismal Swamp, Va. (*Pollard* according to Coult. & Rose), and southw.

* * *Pericarp uniformly corky-thickened and ribs all filiform; leaves not peltate; peduncles much shorter than the petioles.*

5. **H. americàna** L. Propagating by slender tuberiferous stolons; stems filiform, *branching and creeping; leaves thin*, round-reniform, *crenate-lobed* and the lobes crenulate, shining; few-flowered *umbels axillary and almost sessile;* fruit less than 2 mm. broad; intermediate ribs prominent; no oil-bearing layer; seed-section broadly oval. — Common. Fig. 819.

819. H. americana ×4.

6. **H. ranunculoìdes** L. f. *Usually floating; leaves thicker*, round-reniform, 3–7-cleft, the lobes crenate; *peduncles* 2.5–7.5 *cm. long, reflexed in fruit;* capitate umbel 5–10-flowered; fruit 2–3 mm. broad; ribs rather obscure; seed-section oblong. — Muddy shores, e. Pa. to Fla., thence westw. (Trop. regions.)

4. CENTÉLLA L.

Calyx-teeth obsolete. Petals white, imbricated in bud. Carpels 7–9-ribbed and somewhat reticulated. — Creeping perennials with simple ovate leaves. Umbels subtended by 2 conspicuous bracts. (Name of obscure origin.)

1. **C. asiática** (L.) Urban. Leaves repand-toothed, thickish; umbel 2–4-flowered; pedicels very short. (*C. repanda* Small; *Hydrocotyle asiatica* L.) — Md. to Fla. (Tropics.)

5. ERIGENÌA Nutt. Harbinger-of-Spring

Calyx-teeth obsolete. Petals obovate or spatulate, flat, entire, white. Fruit didymous, laterally flattened, the carpels incurved at top and bottom, nearly kidney-form, with 5 very slender ribs, and several (1–3) small oil-tubes in the intervals. — A small glabrous vernal plant, with a simple stem, bearing one or two 2–3-ternately divided leaves, and a few-flowered leafy-bracted umbel. (Name from ἠριγένεια, *born in the spring.*)

1. E. bulbòsa (Michx.) Nutt. Stem 1–2.3 dm. high; leaf-segments linear-oblong; fruit 2 mm. long, 3 mm. broad. — Deciduous woods, etc., s. Ont. and w. N. Y. to Minn., and southw.

6. CHAEROPHÝLLUM [Tourn.] L.

Calyx-teeth obsolete. Fruit narrowly oblong to linear, notched at base, with short beak or none, and equal ribs, oil-tubes solitary in the intervals; seed-face more or less deeply grooved. — Annuals, with ternately decompound leaves, pinnatifid leaflets with oblong obtuse lobes, mostly no involucre, involucels of many bractlets, and white flowers. (Name from χαίρειν, *to gladden*, and φύλλον, *a leaf*, alluding to the agreeable odor of the foliage.)

820. C. procumbens × 3.

1. C. procúmbens (L.) Crantz. More or less hairy; stems slender, spreading, 1.5–5 dm. high; umbels few-rayed; fruit narrowly oblong, 5–10 mm. long, glabrous, contracted but not tapering at the summit, the *intervals broader than the ribs.* — Moist ground, N. Y. to N. C., w. to Mich., Ia., Ark., and Miss. Fig. 820.

Var. Shórtii T. & G. Fruit more broadly oblong to ovate (often somewhat pubescent), not at all contracted at the summit. — Pa. to Va., Ky., and O.

2. C. Tainturièri Hook., var. floridànum Coult. & Rose. Stouter and more pubescent than the preceding species; fruits 7–8 in each umbel, sessile or pediceled, glabrous, the *ribs narrower than the intervals.* — Barrens, Eagle Rock, Mo. (*Bush*); S. C. to Fla.

7. OSMORHÌZA Raf. Sweet Cicely

Calyx-teeth obsolete. Fruit with prominent caudate attenuation at base, and equal ribs. — Glabrous to hirsute perennials with thick aromatic roots, ternately compound leaves, ovate variously toothed leaflets, few-leaved involucres, and white flowers in few-rayed and few-fruited umbels. (Name from ὀσμή, *a scent*, and ῥίζα, *a root.*) Washingtonia Raf.

* *Rays of the umbel mostly bearing involucels.*

821. O. longistylis × 2.

1. O. Claytòni (Michx.) Clarke. *Stems* rather slender, 3–9 dm. high, *villous-pubescent;* leaves 2–3-ternate, crisp-hairy; leaflets mostly 4–7 cm. long, acuminate, crenate-dentate and somewhat cleft; *stipules ciliate-hispid;* fruit (not including the attenuate base) 1–1.3 cm. long; *stylopodium and style* 0.7–1 *mm. long.* (*O. brevistylis* DC.; *Washingtonia Claytoni* Britton.) — Open woods, e. Que. to w. Ont., s. to N. C., Ala., Mo., and Kan.

2. O. longistỳlis (Torr.) DC. Coarser; *stems* 4–12 dm. high, *glabrous* or essentially so except at the nodes; leaflets mostly longer, less cleft; *stipules densely pilose on the margin;* fruit (excluding the attenuate base) 1.2–1.5 cm. long; the seed-face more deeply and broadly concave than in the preceding; *stylopodium and style* 2–4 *mm. long.* (*Washingtonia* Britton.) — Rich woods, e. Que. to Assina., s. to N. C., Ill., Ia., S. Dak., and Col. Fig 821. Var. villicaúlis Fernald. Stems white-villous. — Pa. to Ill. and Kan.

** *Rays of the umbel without involucels.*

3. **O. obtùsa** (Coult. & Rose) Fernald. Stems glabrous or sparingly pubescent, 1.5–7 dm. high; leaves 2–3-ternate, more or less crisp-pubescent; leaflets 1.5–6 cm. long, acuminate, the teeth mucronate; *umbels* naked or obsoletely involucrate, *with* 3–5 *naked finally very divergent rays; fruit on divergent long pedicels*, the enlarged portion 8–12 *mm. long, rounded or short-beaked at tip; stylopodium depressed, broader than high, with the style* 0.3–0.5 *mm. long.* (*Washingtonia* Coult. & Rose.) — Rich chiefly coniferous woods, Nfd. and s. Lab. to the upper St. John Valley, N. B.; and from Assina. and B. C. to N. Mex. and Ariz.

4. **O. divaricàta** Nutt. Similar, usually taller (4–10 dm. high); *umbels with* 3–7 *ascending-spreading rays; fruit on ascending pedicels*, 11–17 *mm. long, with a conical beak* 2 *mm. long; stylopodium conical, with the style about* 1 *mm. long.* (*Washingtonia* Britton.) — Rich chiefly coniferous woods, Gaspé Co., Que., to the White Mts., N. H.; also B. C. to Cal., Nev., etc.

8. SPERMÓLEPIS Raf.

Involucre none but involucels present. Flowers small in pedunculate compound irregular umbels. Stylopodium small, conical. Fruit thin-walled; oil-tubes present. — Slender smooth branching plants. (Name from σπέρμα, *seed*, and λεπίς, *scale*, alluding to the scurfy or bristly fruit.) LEPTOCAULIS Nutt.

1. **S. pàtens** (Nutt.) Robinson. Stem geniculate, 3–5 dm. high; leaf-segments linear-filiform; *fruit merely warty*; oil-tubes many. (*Leptocaulis* Nutt.; *Apiastrum* Coult. & Rose.) — Sandy soil and barrens, n. e. Ind. to Neb., and southwestw.

2. **S. echinàta** (Nutt.) Heller. Similar in habit; fruit bristly; oil-tubes 6. (*Leptocaulis* Nutt.) — Scott Co., Mo. (*Eggert*), and southw.

9. CONÌUM L. POISON HEMLOCK

822. C. maculatum × 4.

Fruit somewhat flattened at the sides, glabrous, with prominent wavy ribs; oil-tubes none, but a layer of secreting cells next the seed, the face of which is deeply and narrowly concave. — Poisonous biennial, with spotted stems, large decompound leaves with lanceolate pinnatifid leaflets, involucre and involucels of narrow bracts, and white flowers. (Κώνειον, the Greek name of the Hemlock, by which criminals and philosophers were put to death at Athens.)

1. **C. MACULÀTUM** L. A large branching herb, in waste places, Que. to Del., Pa., and westw. (Nat. from Eu.) FIG. 822.

10. PTILÍMNIUM Raf. MOCK BISHOP'S-WEED

Fruit ovate, glabrous; carpel with dorsal ribs filiform to broad and obtuse, the lateral very thick and corky, those of the two carpels closely contiguous and forming a dilated obtuse or acute corky band; oil-tubes solitary; stylopodium conical; seed nearly terete. — Smooth annuals, with involucre of foliaceous bracts, involucels of prominent or minute bractlets, and white flowers. (Name unexplained by Rafinesque, presumably from πτίλον, *a feather*, or *down*, in allusion to the finely divided leaves.) DISCOPLEURA DC.

823. P. capillaceum × 4

1. **P. capillàceum** (Michx.) Raf. Plant 3–6(–18) dm. high; leaf-divisions filiform; umbel 5–20-rayed; involucre of filiform bracts usually cleft or parted, and involucels more or less prominent; *fruit* 2–3 *mm. long, acute.* (*Discopleura* DC.) — Brackish (rarely fresh) marshes, along the coast, Mass. to Fla. and Tex.; locally n. in Miss. basin to Mo. and Kan. June–Oct. FIG. 823.

2. **P. Nuttállii** (DC.) Britton. Similar in habit; involucral bracts short and entire; *fruit only* 1 *mm. long*, as broad as high, *blunt*. (*Discopleura* DC.) — Ill. to e. Kan., La., and Tex.

11. AEGOPÒDIUM L. Goutweed

824. A. Podagraria ×4.

Fruit ovate, glabrous, with equal filiform ribs, and no oil-tubes; stylopodium conical and prominent; seed nearly terete. — A coarse glabrous perennial, with creeping root-stock, sharply toothed ovate leaflets, and rather large naked umbels of white flowers. (Name from αἴξ, *goat*, and πόδιον, *a little foot*, probably from the shape of the leaflets.)

1. **A. Podagrária** L. — Waste-heaps, etc., e. Mass. to Del. (Adv. from Eu.) Fig. 824.

12. CICÚTA L. Water Hemlock

Calyx-teeth prominent. Fruit ovoid to nearly orbicular, glabrous, with strong flattish corky ribs (the lateral largest); oil-tubes conspicuous, solitary; stylopodium depressed; seed nearly terete. — Very poisonous plants, with pinnately compound leaves and serrate leaflets, involucre usually none, involucels of several slender bractlets, and white flowers. (The ancient Latin name of the Hemlock.)

825. C. maculata ×4.

1. **C. maculàta** L. (Spotted Cowbane, Musquash Root, Beaver Poison.) Stem *stout*, 1–2.2 m. high, streaked with purple; leaves 2–3-pinnate, the lower on long petioles; *leaflets lanceolate* to oblong-lanceolate, 3–12 cm. long, acuminate; pedicels in the umbellets numerous, very unequal; *fruit* broadly ovate to oval, 3–3.5 mm. long, *shallowly or not at all grooved at the commissure*. — N. B. to Va., and westw., common. Fig. 825.

2. **C. Curtíssii** Coult. & Rose. Coarser; *fruit* 2–3 mm. long, subglobose, *grooved at the junction of the carpels*. — Va. to Ky., and southw. — Perhaps only a variety of the preceding.

826. C. Carvi ×4.

3. **C. bulbífera** L. *Rather slender*, 3–10 dm. high; leaves 2–3-pinnate (sometimes appearing ternate); *leaflets linear*, sparsely toothed, 2–5 cm. long; *upper axils bearing clustered bulblets;* fruit (rare) scarcely 2 mm. long. — Common in swamps, N. S. to Md. and Ida.

13. CARUM L. Caraway

Calyx-teeth small. Fruit ovate or oblong, with filiform or inconspicuous ribs; oil-tubes solitary; stylopodium conical; seed-face plane or nearly so. — Smooth erect slender herbs, with fusiform or tuberous roots, pinnate leaves, involucre and involucels of few to many bracts, and white (rarely pink) flowers. (Name perhaps from the country, *Caria*.)

1. **C. Cárvi** L. (Caraway.) Leaves with filiform divisions. — Naturalized in many places, especially northward. (Nat. from Eu.) Fig. 826.

14. PETROSELÌNUM Hoffm. Parsley

Calyx-teeth obsolete. Petals greenish-yellow, with attenuate incurved points. Fruit ovate, glabrous, laterally compressed; carpels pentagonal, the primary ribs filiform, subequal; oil-tubes solitary in the intervals; stylopodium cushion-like. — Chiefly biennials, with ternately pinnate decompound leaves, toothed leaf-segments, compound umbels, few-parted involucres, and several–many-parted involucels. (Name from πέτρα, *a rock*, and σέλινον, *parsley*.)

1. **P. horténse** Hoffm. (Common P.) Leaflets small, ovate, 3-cleft or -toothed. (*P. sativum* Hoffm.; *Carum Petroselinum* B. & H.) — Commonly cultivated in market gardens, and occasionally found as an escape. (Introd. from the Mediterranean region.)

15. BÉRULA Hoffm.

Calyx-teeth minute. Fruit emarginate at base, glabrous; carpels nearly globose, with very slender inconspicuous ribs and thick corky pericarp; oil-tubes numerous and contiguous about the seed-cavity; seed terete. — Smooth aquatic perennial, with simply pinnate leaves and variously cut leaflets, usually conspicuous involucre and involucels of narrow bracts, and white flowers. (The Latin name of the Water Cress, of Celtic origin.)

827. B. erecta × 3.

1. **B. erécta** (Huds.) Coville. Erect, 2–9 dm. high; leaflets 5–9 pairs, linear to oblong or ovate, serrate to cut-toothed, often laciniately lobed, sometimes crenate, 2–8 cm. long; fruit scarcely 2 mm. long. (*B. angustifolia* Mertens & Koch; *Sium angustifolium* L.) — Swamps and streams, s. Ont. and Mich. to Minn., southw. and westw. July, Aug. Fig. 827.

16. SÌUM [Tourn.] L. Water Parsnip

Calyx-teeth minute. Fruit ovate to oblong, glabrous, with prominent corky nearly equal ribs; oil-tubes 1–3 in the intervals; stylopodium depressed; seed-face plane. — Smooth perennials, with pinnate leaves and serrate or pinnatifid leaflets, involucre and involucels of numerous narrow bracts, and white flowers. (From *σίον*, the Greek name of some marsh plant.)

828. S. cicutaefolium × 4.

1. **S. cicutaefòlium** Schrank. *Stout*, 0.8–2 m. high; *leaflets 3–8 pairs*, linear to lanceolate, sharply serrate and mostly acuminate, 5–12 cm. long, the lower leaves sometimes submersed and finely dissected; *fruit 2.5–3 mm. long*, with prominent ribs. (*S. lineare* Michx.) — Muddy banks, common. Fig. 828. *S. Carsonii* Durand appears to be merely a weak aquatic state or perhaps variety, 2–6 dm. high, with *leaflets 1–3 pairs*, linear, 2–5 cm. long; when submersed or floating, very thin, ovate to oblong, usually laciniately toothed or dissected, the leaf sometimes reduced to the terminal leaflet; fruit slightly smaller.

829. C. canadensis × 4.

17. CRYPTOTAÈNIA DC. Honewort

Calyx-teeth obsolete. Fruit linear-oblong, glabrous, with obtuse equal ribs; oil-tubes solitary in the intervals and beneath each rib; stylopodium slender-conical; seed-face plane. — A glabrous perennial, with thin 3-foliolate leaves, no involucre, involucels of minute bractlets or none, and white flowers. (Name from *κρυπτός*, *hidden*, and *ταινία*, *a fillet*, referring to the concealed oil-tubes.)

1. **C. canadénsis** (L.) DC. Plant 3–9 dm. high; leaflets large, ovate, 5–10 cm. long, pointed, doubly serrate, often lobed; umbels irregular and unequally few-rayed; pedicels very unequal; fruit 4–6 mm. long; often curved. (*Deringa* Ktze.) — N. B. to Ga., w. to Tex. and w. Ont. June–Sept. Fig. 829.

18. ZÍZIA Koch.

Calyx-teeth prominent. Fruit ovate to oblong, glabrous, with filiform ribs. Oil-tubes large and solitary in the broad intervals, and a small one in each rib;

stylopodium wanting; seed terete. — Smooth perennials, with mostly *Thaspium*-like leaves, no involucre, involucels of small bractlets, yellow flowers, and the central fruit of each umbellet sessile. Flowering in spring. (Named for *I. B. Ziz*, a Rhenish botanist.)

830. Z. aurea ×4.

1. Z. aúrea (L.) Koch. (Golden Alexanders.) *Leaves* (except the uppermost) 2–3-*ternate*, the radical very long-petioled; *leaflets ovate to lanceolate*, sharply serrate, *acuminate;* rays 15–25, stout, 2–5 cm. long; *fruit oblong, about* 4 *mm. long.* — River-banks, meadows, and rich woods, e. Que. to Sask., s. to Va., Ark., and Tex. Fig. 830. Var. obtusifòlia Bissell. Leaflets broader, rounded at tip. — Local, w. Ct.

2. Z. Bébbii (Coult. & Rose) Britton. Slender; leaflets somewhat coarsely serrate, the lower leaves small, inclined to be simple; rays 2–8, slender, 5–7 cm. long; *fruit oval*, 2–3 *mm. long.* (*Z. aurea*, var. Coult. & Rose.) — Mts., W. Va. to Ga. and Tenn.

3. Z. cordàta (Walt.) DC. *Radical leaves* mostly long-petioled, *cordate or even rounder, crenately toothed*, very rarely lobed or divided; *stem-leaves simply ternate or quinate*, with the ovate or lanceolate leaflets serrate, incised, or sometimes parted; *fruit ovate*, 3 *mm. long.* — Ct. (*Eames*) to N. C., w. to Alb., Col., and westw.

19. FOENÍCULUM [Tourn.] Hill. Fennel

Fruit oblong, glabrous, with prominent ribs and solitary oil-tubes. — Stout glabrous aromatic herb, with leaves dissected into numerous filiform segments, no involucre nor involucels, and large umbels of yellow flowers. (The Latin name, from *foenum*, hay.)

1. F. vulgàre Hill. (*F. officinale* All.; *F. Foeniculum* Karst.), the cultivated Fennel from Europe, is a common escape, and somewhat naturalized in Md. and Va.

20. PIMPINÉLLA L.

Fruit oblong to ovate, glabrous, with slender equal ribs, numerous oil-tubes, and depressed or cushion-like stylopodium. — Smooth perennials, with involucre and involucels scanty or none; ours with white flowers. (Name said to be formed from *bipinnula*, referring to the bipinnate leaves.)

831. T. integerrima ×6.

1. P. Saxífragra L. Leaves simply pinnate, with sharply toothed leaflets; fruit oblong, 2 mm. long; stylopodium cushion-like. — Roadsides and waste places, local, N. B. to Del., Pa., and O. (Nat. from Eu.)

21. TAENÍDIA Drude.

Fruit short-oblong, flattened laterally, wingless, glabrous; oil-tubes mostly 3 in the intervals; seed subterete but the face slightly concave. Involucre and involucels mostly wanting. Flowers yellow. — Glabrous glaucous perennial, with ternate leaves. (Name from ταινίδιον, *a little band*, in reference to the small scarcely prominent ribs.)

1. T. integérrima (L.) Drude. Slender, 5–10 dm. high; leaves 2–3-ternate; leaflets lanceolate to ovate, entire; fruit oblong, 4 mm. long. (*Pimpinella* Gray.) — Dry gravelly woods and thickets, w. Que. and w. N. E. to N. C., Ark., and Minn. Fig. 831.

22. EÙLOPHUS Nutt.

Calyx-teeth prominent. Fruit ovate or oblong, glabrous, with equal filiform ribs; oil-tubes 1–5 in the intervals; stylopodium conical, with long recurved styles; seed-face broadly concave, with a central longitudinal ridge. — Ours

with pinnately compound leaves, involucels of numerous narrowly lanceolate acuminate bractlets, and long-peduncled umbels of white flowers. (Name from εὖ, *well*, and λόφος, *a crest*, alluding to the calyx or perhaps to the plume-like leaves.)

1. E. americànus Nutt. Radical and lower stem-leaves large, 1–2-pinnately compound, with leaflets cut into short narrow segments; upper stem-leaves ternate, with narrowly linear elongated leaflets; fruit 4–6 mm. long.—O. to Mo., Tenn., and Ark. July. FIG. 832.

832. E. americanus ×4.

23. ANTHRÍSCUS Bernh. CHERVIL

Fruit linear, notched at base, beaked, glabrous, without ribs (but beak ribbed); oil-tubes none, stylopodium conical, seed-face sulcate. — Resembling *Chaerophyllum* in vegetative characters. (The ancient Roman name.)

1. A. CEREFÒLIUM (L.) Hoffm. Mature fruit smooth and shining. — Waste places, fields, etc., Que. and e. Pa. (Introd. from Eu.)

24. SCANDIX [Tourn.] L. VENUS' COMB

Fruit narrowly oblong, terminating in a long linear beak. Oil-tubes solitary at the intervals or none. Carpels subterete. Seed concave on the inner face.—Slender annuals with pinnately much divided leaves and white flowers. (Ancient Greek name of the Chervil.)

1. S. PÉCTEN-VÉNERIS L. Sparingly pubescent, 2–5 dm. high, commonly branched from the base; flowers nearly sessile; the beak of the fruit 4–6 cm. long, densely ciliate on the edges.—Waste places, especially near Atlantic ports, more sparingly westw. (Adv. from Eurasia.)

25. BUPLEÙRUM [Tourn.] L. THOROUGH-WAX

Calyx-teeth obsolete. Fruit oblong, with very slender ribs, no oil-tubes, depressed stylopodium, and seed-face somewhat concave. — Smooth annual, with ovate perfoliate entire leaves, no involucre, involucels of 5 very conspicuous ovate mucronate bractlets, and yellow flowers. (Name from βοῦς, *an ox*, and πλευρόν, *a rib*.)

1. B. ROTUNDIFÒLIUM L.—Frequent in fields, etc., N. H. to N. C., S. Dak., and Ariz. (Nat from Eu.)

26. LILAEÓPSIS Greene.

Calyx-teeth small. Fruit globose or slightly flattened laterally; dorsal ribs filiform, the lateral thick and corky; oil-tubes solitary in the intervals, 2 on the commissure. — Dwarf creeper with hollow cylindrical or awl-shaped nodose petioles in place of leaves, simple few-flowered umbels, and white flowers. (Named from its resemblance to *Lilaea*.) CRANTZIA Nutt., not Scop.

1. L. lineàta (Michx.) Greene. Leaves very obtuse, 2–8 cm. long, 2–4 mm. broad; fruit 2 mm. long, the thick lateral wings forming a corky margin. (*Crantzia* Nutt.) — In mud of brackish marshes along the coast, N. E. to Miss. July. (Widely distributed.)

27. CYNOSCIÀDIUM DC.

Calyx-teeth distinct. Fruit short, glabrous, scarcely flattened; lateral ribs forming a corky margin; stylopodium conical. — Slender annuals, with pinnately divided leaves. Involucre and involucels present. Petals white. (Name from κύων, *dog*, and σκιάδιον, *a sunshade*, a fanciful designation referring to the umbels.)

1. **C. pinnàtum** DC. Segments of the leaves 2–3 pairs, narrow, distant, the terminal one the longest. — McDonald Co., Mo. (*Bush*) to Kan. and Tex.

833. L. scothicum × 4.

28. LIGÚSTICUM L. Lovage

Fruit oblong or ovate, flattened laterally if at all, glabrous; carpels with prominent equal acute ribs and broad intervals, oil-tubes 2–6 in the intervals, 6–10 on the commissure. Stylopodium conical. — Smooth perennials, from large aromatic roots, with large ternately compound leaves, mostly no involucre, involucels of narrow bractlets, and white flowers in large many-rayed umbels. (Named from the country *Liguria*, where the officinal *Lovage* of the gardens abounds.)

1. **L. canadénse** (L.) Britton. (Nondo, Angelico.) Stem stout, branched, 1–2 m. high; *leaves very large, 3–4-ternate; leaflets broadly oblong*, 5–12 cm. *long, coarsely serrate; fruit ovate*, 4–6 mm. long; seed with angled back. (*L. actaeifolium* of auth., not Michx.) — Rich ground, s. Pa. to Mo., and southw.

2. **L. scóthicum** L. (Scotch L.) Stem simple, 3–6 dm. high; leaves biternate; *leaflets* ovate, 2.5–5 *cm. long, coarsely toothed; fruit narrowly oblong*, 8–10 *mm. long;* seed with round back. — Salt marshes and rocks, along the coast from N. Y. northw. Aug. (Eu.) Fig. 833.

29. CORIÁNDRUM [Tourn.] L. Coriander

Fruit nearly globose, not at all narrowed at the commissure; ribs filiform or acutish. Seed dorsally compressed, somewhat concave on the inner face. — Slender glabrous herbs, with pinnately dissected leaves, compound umbels, no involucre, few-parted involucels, and white or roseate unequal petals. (The ancient Latin name.)

1. **C. satìvum** L. Lower leaves pinnate, the leaflets flabelliform, many-cleft, cuneate at the base, upper leaves deeply cut into linear segments. — Waste places, becoming frequent. (Adv. from Eurasia.)

834. A. Cynapium × 4.

30. AETHÙSA L. Fool's Parsley

Calyx-teeth obsolete. Fruit ovoid-globose, slightly flattened dorsally; carpel with 5 thick sharp ribs; oil-tubes solitary in the intervals, 2 on the commissure. — Poisonous annuals, with 2–3-ternately compound leaves, divisions pinnate, ultimate segments small and many-cleft, no involucre, long narrow involucels, and white flowers. (*Αἴθουσα, burning*, in allusion to the bright or shining foliage, probably in translation of the Swedish vernacular name *glis*.)

1. **A. Cynàpium** L. A fetid poisonous herb, in waste or cultivated grounds, from N. S. to Pa., Minn., and Ont. June–Aug. (Nat. from Eu.) Fig. 834.

31. COELOPLEÙRUM Ledeb.

Fruit globose to ellipsoid, with prominent nearly equal thick corky ribs (none of them winged); oil-tubes solitary in the intervals and under the ribs, 2–4 on the commissure. Seed loose in the pericarp. — Stout glabrous (or inflorescence puberulent) maritime perennials, with 2–3-ternate leaves on very large inflated petioles, few-leaved deciduous involucre, involucels of numerous small linear-lanceolate bractlets (often conspicuous or even leaf-like), and greenish-white flowers in many-rayed umbels. (From *κοῖλος, hollow*, and *πλευρόν, a rib*.)

1. **C. actaeifòlium** (Michx.) Coult. & Rose. Stem **3–12 dm.** high; leaflets ovate, irregularly cut-serrate, 5–7 cm. long; **fruit** 4–7 mm. long. (*C. Gmelini* of auth., not Ledeb.)— **Rocky coasts**, Mass. to Greenl. Fig. 835.

32. CYMÓPTERUS Raf.

835. C. actaeifolium × 3.

Calyx-teeth more or less prominent. Fruit usually globose, with all the ribs conspicuously winged; oil-tubes 1–several in the intervals, 2–8 on the commissure. Stylopodium depressed. Seed-face slightly concave. — Mostly low (often cespitose) glabrous perennials, from a thick elongated root, with more or less pinnately compound leaves, with or without an involucre, prominent involucels, and white flowers (in ours). (From κῦμα, *a wave*, and πτερόν, *a wing*, referring to the often undulate wings.)

1. **C. acaúlis** (Pursh) Rydb. Low (1–2 dm. high), with a short erect caudex bearing leaves and peduncles at the summit, glabrous; rays and pedicels very short, making a compact cluster; involucre none; involucel of a single palmately 5–7-parted bractlet; fruit globose, 6–8 mm. in diameter; wings rather corky; oil-tubes 4–5 in the intervals. (*C. glomeratus* Raf.) — Minn. to Ia., Ark., and westw.

33. THÁSPIUM Nutt. Meadow Parsnip

Calyx-teeth conspicuous. Fruit ovoid to oblong, slightly flattened dorsally; carpel with 3 or 4 or all the ribs strongly winged; oil-tubes solitary in the intervals, 2 on the commissure. Stylopodium wanting; styles long. — Perennials, with ternately divided leaves (or the lower simple) and broad serrate or toothed leaflets, mostly yellow flowers, and all the fruit pediceled. (Name a play upon *Thapsia*, so called from the island of Thapsus.)

836. T. aureum. Fruit × 4. Cross-section of fruit × 5.

1. **T. aúreum** Nutt. *Glabrous; root-leaves mostly cordate, serrate; stem-leaves simply ternate* (rarely biternate); leaflets ovate to lanceolate, round or tapering at base, serrate; *flowers deep yellow;* fruit globose-ovoid, about 4 mm. long, *all the ribs equally winged.* — Thickets and woodlands, n. O. to Md., Ga., Ark., and Wyo. — Fl. summer. Fig. 836.

Var. **atropurpùreum** (Desr.) Coult. & Rose. Petals dark-purple. — N. J. to Ga. and Ill.

2. **T. barbinòde** (Michx.) Nutt. Loosely branched, *pubescent on the joints*, sometimes puberulent in the umbels; *leaves 1–3-ternate; leaflets ovate to lanceolate*, acute, with cuneate base, coarsely cut-serrate, often ternately cleft or parted; *flowers light yellow; fruit* broadly oblong, about 6 mm. long and 4 mm. broad, *with mostly 7 prominent wings.* — Banks of streams, N. Y. to Minn., and southw. May–June. Var. Angustifòlium Coult. & Rose, has narrower more sharply cut leaflets, and fruit more or less puberulent. — Pa. to Pt. Pelee, Ont., and Ill.

3. **T. pinnatífidum** (Buckley) Gray. Resembling the last, but *puberulent on the branchlets, umbels, and fruit, with fewer leaves; leaflets 1–2-pinnatifid*, the lobes linear or oblong; one or two leaves near the base often very large and long-petioled; flowers light yellow; fruit oblong, 3–5 mm. long and 2–3 mm. broad, *all the ribs winged*, generally three of them narrowly so. — Barrens and mts., Ky. to Tenn. and N. C.

34. LOMÀTIUM Raf.

Fruit flattened dorsally, oblong to nearly orbicular, laterally winged; oil-tubes usually many. Roots fusiform. Leaves dissected. Involucre none. —

Perennials of dry ground, nearly or quite acaulescent. Petals yellow or white. (Name from λῶμα, *a border*, referring to the winged fruit.) PEUCEDANUM of Am. auth., but scarcely of L.

1. **L. orientàle** Coult. & Rose. Pubescent, 1–2 dm. high; leaves bipinnate; petals white or pinkish; fruit nearly round; dorsal ribs indistinct. (*Peucedanum nudicaule* Nutt., in part.)—Gravelly soil, Minn. to Ia., Kan., and westw.

2. **L. daucifòlium** (Nutt.) Coult. & Rose. Leaves finely dissected; petals yellow; fruit oval; dorsal ribs prominent. (*Peucedanum villosum* Nutt., in part.) — Barrens, w. Mo. to Neb. and Tex.

35. PSEUDOTAENÍDIA Mackenzie.

Calyx-teeth short, thickish. Petals inferentially yellow. Fruit thickish, strongly compressed dorsally, oblong-lanceolate; carpels obcompressed, with slender dorsal ribs and broad somewhat corky lateral wings. Oil-tubes mostly solitary in the intervals. — Glabrous erect perennial, with 2–3-ternate leaves, entire leaflets and exinvolucrate compound umbels. (Name from ψεῦδος, *false*, and *Taenidia*, to which this recently discovered genus possesses a marked habital resemblance.)

1. **P. montàna** Mackenzie. Slender, erect, 5–8 dm. high; root slightly thickened; petioles broad and clasping; leaflets elliptical to lance-ovate or -oblong, entire, thin; umbels 6–12-rayed; involucels none or inconspicuous; fruit 6 mm. long. — Clayey and rocky mountain slopes, Kate's Mt., W. Va. (*Mackenzie*) and Luray Cavern, Va. (*Steele*).

837. P. Nuttallii ×3.

36. POLYTAÈNIA DC.

Calyx-teeth conspicuous. Fruit obovate to oval, much flattened dorsally; dorsal ribs small or obscure in the depressed back, the lateral with broad thick corky closely contiguous wings forming the margin of the fruit; oil-tubes 12–18 about the seed and many scattered through the thick corky pericarp. — A perennial mostly glabrous herb, with 2-pinnate leaves (upper opposite and 3-cleft), the segments cuneate and incised, no involucre, narrow involucels, and bright yellow flowers in May. (Named from πολύ-, *many*, and ταινία, *a fillet*, alluding to the numerous oil-tubes.)

1. **P. Nuttállii** DC. Plant 5–10 dm. high; pedicels and involucels pubescent. — Barrens, Mich. to n. Ala., Tex., Okla., Ia., and Wisc. FIG. 837.

37. PASTINÀCA L. PARSNIP

Calyx-teeth obsolete. Fruit oval, very much flattened dorsally; dorsal ribs filiform, the lateral extended into broad wings, which are strongly nerved toward the outer margin; oil-tubes small, solitary in the intervals, 2–4 on the commissure; stylopodium depressed. — Tall stout glabrous biennial, with pinnately compound leaves, mostly no involucre or involucels, and yellow flowers. (The Latin name, from *pastus*, food.)

1. **P. SATÌVA** L. Stem grooved; leaflets ovate to oblong, cut-toothed. — Waste places, open rich soil, etc. (Nat. from Eu.) FIG. 838.

838. P. sativa ×3.

38. LEVÍSTICUM [Rivinius] Hill. LOVAGE

Calyx-teeth obscure. Petals greenish-yellow. Fruit oblong, rounded at each end, strongly ribbed, the lateral ribs moderately winged; oil-tubes solitary in the intervals, 2 on the commissure; seed flattish on the inner face. — Stout

perennial herb, with branched stems, large bipinnate leaves with rhombic-obovate and compound conspicuously involucrate umbels. (Name said to be a corruption of *Ligusticum*.)

1. L. OFFICINÀLE (L.) Koch. Essentially glabrous; leaflets coarsely toothed toward the apex, entire at the cuneate base. (*L. Levisticum* Karst.) — Cultivated for the aromatic qualities especially of its seeds, and now occasionally found as a local escape. (Introd. from s. Eu.)

39. ANÈTHUM [Tourn.] L. DILL

Petals yellow. Fruit elliptical, flattened dorsally, the lateral ribs winged. Involucre and involucels none. — Slender caulescent annuals with finely divided leaves, and compound umbels. (Ἄνηθον, ancient Greek name of the *dill*, thought to come from ἄθειν, *to burn*, in allusion to the pungent seeds.)

1. A. GRAVÈOLENS L. Erect, glabrous, usually branched, 3–10 dm. high; leaves finely dissected, fennel-like. — Thoroughly established at Bridgeport, Ct. (*Eames*), and casual on waste ground, etc., elsewhere. (Introd. from Eu.)

40. HERACLÈUM L. COW PARSNIP

Fruit obovate, as in *Pastinaca*, but with a thick conical stylopodium, and the conspicuous obclavate oil-tubes extending scarcely below the middle. — Tall stout perennials, with large compound leaves, broad umbels, deciduous involucre, and many-leaved involucels, white or purplish flowers, and obcordate petals, the outer ones commonly larger and 2-cleft. (Dedicated to *Hercules*.)

839. H. lanatum × 2.

1. H. lanàtum Michx. Woolly; stem grooved, 1–2.8 m. high; *leaves ternate; leaflets* broad, irregularly *cut-toothed.* — Wet ground, Nfd. to the Pacific, and southw. to N. C., Ky., and Kan. June. FIG. 839.

2. H. SPHONDÝLIUM L. Spreading-pubescent and somewhat scabrous; *leaves pinnate; leaflets* 3–7, coarsely and rather *bluntly toothed.* — Casual on waste land, etc., chiefly about Atlantic ports. (Adv. from Eu.)

41. IMPERATÒRIA [Tourn.] L.

Calyx-teeth obsolete. Petals small, white. Fruit suborbicular or broadly elliptical, distinctly cordate at base and apex, smooth, the ribs filiform except the lateral, which are developed into a broad thin wing; stylopodium conical; oil-tubes solitary in the intervals and as long or nearly as long as the fruit. — Stately smoothish perennials, with ternately compound leaves. (From *imperator*, master, emperor, in allusion, it is said, to its powerful medicinal qualities.)

1. I. OSTRÙTHIUM L. (MASTERWORT.) Stem hollow, 8–15 dm. high; leaflets large, ovate or obovate, serrate and commonly incised, nearly or quite glabrous; umbels with very numerous rays exinvolucrate or nearly so; bracts of the involucels few, narrow, inconspicuous. —Formerly cultivated, now locally established in e. Pa., Mich., and perhaps elsewhere. (Introd. from Eu.)

42. OXÝPOLIS Raf.

Calyx-teeth evident. Fruit ovate to obovate, flattened dorsally; dorsal ribs filiform, the lateral broadly winged, closely contiguous and strongly nerved next to the body (giving the appearance of 5 dorsal ribs); oil-tubes solitary in the intervals, 2–6 on the commissure; stylopodium short, thick-conical. — Glabrous erect aquatic herbs; involucre and involucels present, and flowers white. (Derivation unexplained.) TIEDEMANNIA DC.

1. **O. filifórmis** (Walt.) Britton. Stem hollow, 4–20 dm. high; *leaves reduced to cylindrical hollow pointed nodose petioles; fruit obovate*, rounded or truncate at the ends. (*Tiedemannia teretifolia* DC.) — Ponds, Va. to Fla. and La. Aug., Sept.

Var. **Cánbyi** Coult. & Rose. Fruit short, suborbicular, retuse at both ends. — Ellendale, Del. (*Canby, Commons*).

2. **O. rigídior** (L.) Coult. & Rose. (COWBANE.) Stem 6–15 dm. high; *leaves simply pinnate*, with 3–9 linear to lanceolate remotely toothed leaflets; oil-tubes mostly small. (*Tiedemannia rigida* Coult. & Rose.) — Swamps, N. Y. to Minn., s. to the Gulf. Aug. — Poisonous; roots tuberiferous. Var. AMBÍGUA (Nutt.) Robinson (Var. *longifolia* Britton) with entire leaflets, occurs in N. J., and southw. FIG. 840.

840. O. rigidior × 4.

43 CONIOSELÌNUM Fisch. HEMLOCK PARSLEY

Fruit oval, flattened dorsally, glabrous, the lateral ribs extended into broad wings; seed slightly concave on the inner face. — Tall slender glabrous perennials, with finely 2–3-pinnately compound leaves, few-leaved involucre or none, involucels of elongated (in ours) linear-setaceous bractlets, and white flowers. (Compound of *Conium* and *Selinum*, from its resemblance to these genera.)

1. **C. chinénse** (L.) BSP. Leaflets pinnatifid; wings nearly as broad as the seed; oil-tubes 2–3 in the intervals, sometimes 1 or 4. (*C. canadense* T. & G.) — Swamps and cold cliffs, Nfd. to Ont., s. to N. E., N. Y., Ind., Minn., and in the mts. to N. C. Aug.–Oct. FIG. 841.

44. ANGELICA L. ANGELICA

841. C. chinense × 4.

Fruit strongly flattened dorsally; primary ribs very prominent, the lateral extended into broad distinct wings, forming a double-winged margin to the fruit; oil-tubes 1–several in the intervals or indefinite, 2–10 on the commissure. — Stout perennials, with ternately or pinnately compound leaves, large terminal umbels, scanty or no involucres, small many-leaved involucels, and white or greenish flowers. (Named *angelic* from its cordial and medicinal properties.)

* *Seed adherent to the pericarp; oil-tubes 1–several in the intervals; uppermost leaves mostly reduced to large inflated petioles.*

1. **A. Curtísii** Buckley. Glabrous; leaves twice ternate or the divisions quinate; *leaflets thin*, ovate-lanceolate, *sharply and irregularly toothed*, 2.5–8 cm. broad; fruit glabrous, 3–9 mm. broad; oil-tubes mostly solitary (rarely 2–3) in the intervals. — Along the Alleghenies from Pa. to N. C. Aug.

2. **A. villòsa** (Walt.) BSP. *Pubescent above;* leaves twice pinnately or ternately divided; *leaflets thickish*, lanceolate to oblong, 1–2 cm. broad, *serrate; fruit pubescent*, 4 mm. broad; oil-tubes 3–6 in the intervals. (*A. hirsuta* Muhl.) — Rocky woods, w. Mass. to Minn., Tenn., and Fla. July.

3. **A.** SYLVÉSTRIS L. Puberulent above; leaves ternately bipinnate; *leaflets thin, ovate to lanceolate, finely serrate; fruit glabrous*, 5–6 mm. long, 3 mm. broad; oil-tubes mostly 1 in each interval. — Old fields, Louisburg, Cape Breton I. (*Macoun*). (Nat. from Eu.)

842. A. atropurpurea × 3.

** *Seed loose; oil-tubes indefinite* (25–30); *upper petioles not so prominent.*

4. **A. atropurpùrea** L. Very stout, glabrous throughout,

with dark purple stem; leaves 2–3-ternately divided, the pinnate segments of 5–7 lanceolate to ovate leaflets, 2–4 cm. broad, sharply mucronate-serrate. (*Archangelica* Hoffm.) — Alluvial soils, Nfd. to Del., Ill., Ia., Minn., and w. Ont. Fig. 842.

45. TÓRILIS Adans.

Calyx-teeth short, triangular, persistent. Fruit bristly with hooked prickles or warty, the primary ribs not so prominent as the secondary. — Erect slender caulescent annuals with bipinnate leaves, compound umbels, and dense heads of white flowers, the involucres and involucels of linear bracts. (Etymology unknown.) Caucalis of auth., in part.

1. **T.** Anthríscus (L.) Bernh. *Umbels* open, loose, *long-peduncled*, raised above the leaves; *prickles evenly distributed on the fruit.* (*Caucalis* Huds.) — Open woods and waste places, N. Y. to D. C., Ky., and O. (Nat. from Eu.)

2. **T.** nodòsa (L.) Gaertn. Umbels dense, subcapitate; *peduncles much shorter than the leaves; prickles often confined to one side of the elsewhere warty carpels.* (*Caucalis* Scop.) — Similar situations, from the Middle Atlantic States westw. (Adv. from Eu.)

46. DAÚCUS [Tourn.] L. Carrot

843. D. Carota ×3⅓.

Fruit oblong, flattened dorsally; stylopodium depressed; carpel with 5 slender bristly primary ribs and 4 winged secondary ones, each of the latter bearing a single row of barbed prickles: oil-tubes solitary under the secondary ribs, two on the commissural side. — Bristly annuals or biennials, with pinnately decompound leaves, foliaceous and cleft involucral bracts, and compound umbels which become strongly concave. (The ancient Greek name.)

1. **D.** Caròta L. Biennial; stem bristly; ultimate leaf-segments lanceolate and cuspidate; rays numerous. — Fields and waste places; a pernicious weed. — The flowers vary from white to roseate or pale yellow, the central one in each umbel usually dark purple. (Nat. from Eu.) Fig. 843.

CORNÀCEAE (Dogwood Family)

Shrubs or trees (rarely herbaceous), with opposite or alternate simple leaves, the calyx-tube adherent to the 1–2-celled ovary, its limb minute, the petals (valvate in the bud) and as many stamens borne on the margin of an epigynous disk in the perfect flowers; style one; a single anatropous ovule hanging from the top of the cell; the fruit a 1–2-seeded drupe; embryo nearly as long as the albumen, with large foliaceous cotyledons. — Including two genera with us, of which *Nyssa* is partly apetalous. Bark bitter and tonic.

1. **Cornus.** Flowers perfect, 4-merous. Leaves mostly opposite.
2. **Nyssa.** Flowers dioeciously polygamous, 5-merous. Leaves alternate.

1. CÓRNUS [Tourn.] L. Cornel. Dogwood

Flowers perfect (or in some foreign species dioecious). Calyx minutely 4-toothed. Petals 4, oblong, spreading. Stamens 4; filaments slender. Style slender; stigma terminal, flat or capitate. Drupe small, with a 2-celled and 2-seeded stone. — Leaves opposite (except in one species), entire. Flowers small, in open naked cymes, or in close heads surrounded by a corolla-like involucre. (Name from *cornu*, a horn; alluding to the hardness of the wood.)

§ 1. *Flowers greenish or purple in a close cluster, surrounded by a showy usually 4-bracted corolla-like white or pinkish involucre; fruit bright red.*

1. **C. canadénsis** L. (Dwarf C., Bunchberry.) *Stems low and simple*, 9–22 cm. high, from a slender creeping and subterranean rootstock; *leaves* scarcely petioled, the lower scale-like, *the upper crowded into an apparent whorl* in sixes or fours (rarely opposite), ovate or oval, pointed; *bracts of the involucre ovate, short-acuminate; flowers greenish-white* or the petals purple-tipped; fruit globular. — Damp cold woods, Lab. to Alaska, s. to N. J., W. Va., Ind., Minn., etc. June, July. (E. Asia.) — Leaves and involucres (rarely 3) often modified and variously colored.

2. **C. suécica** L. Similar but more slender; *leaves short-oval, in 3-several pairs*, not verticillate; *flowers deep violet; involucral bracts* ovate, *obtusish*, usually smaller than in the preceding. — Wooded crests of headlands and cliffs, Rivière du Loup, Que., and Nfd. to Greenl. and Alaska. July. (Boreal Eurasia.)

3. **C. flórida** L. (Flowering D.) *Tree*, 4–12 m. high; leaves ovate, pointed, acutish at the base; *bracts of the involucre obcordate*, 3–6 cm. long; *fruit ovoid.* — Dry woods, from s. Me. to Ont. and s. Minn., s. to Fla. and Tex. May, June. — Very showy in flower, scarcely less so in fruit.

§ 2. *Flowers white, in open flat spreading cymes; involucre none; fruit spherical; leaves all opposite (except in no. 11.)*

* *Pubescence woolly and more or less spreading.*

+ *Fruit light blue.*

4. **C. circinàta** L'Hér. (Round-leaved C. or D.) Shrub, 2–3 m. high; *branches greenish*, warty-dotted; *leaves round-oval, abruptly pointed, woolly beneath*, 5–12 cm. broad; cymes flat; fruit light blue. — Copses, in rich or sandy soil, or on rocks, e. Que. to Man., s. to Va., Ind., Ill., Ia., and N. Dak. June, July.

5. **C. Amòmum** Mill. (Silky C., Kinnikinnik.) Shrub, 1–3 m. high; *branches purplish; the branchlets, stalks, and lower surface of the ovate or elliptical pointed leaves silky-downy* (often rusty), pale and dull, not microscopically papillose; cymes flat, close; calyx-teeth lanceolate; fruit pale blue. (*C. sericea* L.) — Wet places, Nfd. to N. D., s. to Fla. and La. June. — *C. Purpusi* Koehne, with slightly narrower leaves microscopically papillose but not rusty-pubescent beneath, appears to be an inconstant form rather than a distinct species.

+ + *Fruit white.*

6. **C. asperifòlia** Michx. *Branches brownish; the branchlets, etc., rough-pubescent; leaves oblong or ovate*, on short petioles, pointed, *rough* with a harsh pubescence *above, and downy beneath;* corolla subcylindric in bud, petals rather long; calyx-teeth minute; fruit white, 5–6 mm. in diameter. — Dry or sandy soil, n. shore of L. Erie to Minn., Kan., and southw. May, June. — A rather tall shrub. C. Príceae Small, of Ky. and Tenn., is said to have smaller fruit (about 3 mm. in diameter).

7. **C. Bailèyi** Coult. & Evans. Branchlets brownish, spreading-pubescent, not scabrous; *leaves* ovate to ovate-lanceolate, *not scabrous*, appressed-pubescent above, covered beneath with spreading and subappressed pubescence; corolla ovoid in bud; petals short; fruit pure white. — Sandy shores, etc., w. Pa. and s. Ont. to Minn. and Man.

** *Pubescence closely appressed, straight and silky, or none.*

8. **C. stolonífera** Michx. (Red-osier D.) *Branches, especially the osier-like shoots* of the season, *bright red-purple, smooth; leaves ovate*, rounded at base, abruptly short-pointed, roughish with a minute close pubescence on both sides, *whitish underneath;* cymes small and flat, rather few-flowered, smooth; *fruit white or lead-color* (rarely blue). — Wet places, Nfd. to Mackenzie, s. to D. C., Great L. region, Ia., Neb., N. Mex., etc.; common, especially northw. —

Multiplies freely by prostrate or subterranean suckers, and forms broad clumps 1–2 m. high. June–Aug.

9 **C. stricta** Lam. (Stiff C.) A shrub 2–5 m. high; branches brownish or reddish, smooth; *leaves ovate or ovate-lanceolate*, taper-pointed, acutish at base, *glabrous, or nearly the same hue both sides; cymes loose, flattish; anthers and fruit pale blue.* — Swamps, Va. and Mo., southw. Apr., May.

10. **C. paniculáta** L'Hér. Shrub 1–2.5 m. high, much branched; *branches gray, smooth; leaves ovate-lanceolate*, taper-pointed, acute at base, *whitish beneath* but not downy; *cymes convex, loose*, often panicled; *fruit white*, depressed-globose, *on bright red pedicels.* (*C. candidissima* Marsh. ?, not Mill.) — Thickets and river-banks, centr. Me. to Ont., Minn., and southw. June, July.

11. **C. alternifòlia** L. f. Shrub or tree 2–6 m. high; *branches greenish, streaked with white, the alternate leaves clustered at the ends*, ovate or oval, long-pointed, acute at base, whitish and minutely pubescent beneath; cymes very broad and open; *fruit deep blue*, on reddish stalks. — Copses, e. Que. to w. Ont., Minn., and Ia., s. to Ga. and Ala. May, June.

2. NŸSSA L. Tupelo. Pepperidge. Sour Gum

Flowers borne at the summit of axillary peduncles. *Stam. Fl.* numerous. Calyx small, 5-parted. Petals as in fertile flower or none. Stamens 5–12, oftener 10, inserted on the outside of a convex disk. No pistil. *Pist. Fl.* solitary, or 2–8, sessile in a bracted cluster, much larger than the staminate flowers. Petals very small and fleshy, deciduous, or often wanting. Stamens 5–10, with perfect or imperfect anthers. Style elongated. Drupe ovoid or ellipsoid. — Trees with entire or sometimes angulate-toothed alternate leaves and greenish flowers. (The name of a Nymph: "so called because it [the original species] grows in the water.")

1. **N. sylvática** Marsh. (Black Gum.) Middle-sized tree, with horizontal branches; leaves oval or obovate, commonly acuminate, glabrous or villous-pubescent when young, at least on the margins and midrib, shining above when old; *fertile flowers* 3–8, at the summit of a slender peduncle; *fruit ovoid*, acid, *bluish-black*, about 1.2 cm. long. (*N. multiflora* Wang.) — Rich soil, either moist or nearly dry, s. Me. and n. Vt. to Mich., s. to Fla. and Tex. Apr., May. — Leaves turning bright crimson in autumn. Wood firm, close-grained.

Var. **biflòra** (Walt.) Sarg. Leaves narrower, subcoriaceous, more obtuse; stone decidedly furrowed. (*N. biflora* Walt.) — Marshes, southw.; sometimes well marked.

2. **N. aquática** L. A large tree; leaves oblong or ovate, sometimes slightly cordate at base, long-petioled, entire or angulate-toothed, pale and downy-pubescent beneath, at least when young, 1–3 dm. long; *fertile flower solitary* on a slender peduncle; *fruit ellipsoid, blue*, 2.5 cm. or more in length. (*N. uniflora* Wang.) — Deep swamps, s. Va. to s. Ill. and Mo., s. to Fla. and Tex. Apr. — Wood soft; that of the roots very light and spongy.

ERICÂCEAE (Heath Family)

Shrubs, sometimes herbs, with the flowers regular or nearly so; stamens as many or twice as many as the 4–5-lobed or 4–5-petaled corolla, free from but inserted with it; anthers 2-celled, commonly appendaged, or opening by terminal chinks or pores, introrse (except in Subfamily I); *style* 1; *ovary* 3–10-*celled.* Pollen compound, of 4 united grains (except in Subfamily II). Seeds small, anatropous Embryo small, or sometimes minute, in fleshy albumen. — A large family, very various in many of the characters, ours comprising four well-marked subfamilies.

Subfamily I. PYROLOÍDEAE (Pyrola Subfamily)

Calyx free from the ovary. Corolla polypetalous. Anthers extrorse in the bud, opening by pores at the base (inverted in the flower). Seeds with a loose and translucent cellular coat much larger than the nucleus.

Tribe I. CLÈTHREAE. Shrubs or trees, with deciduous foliage (in ours). Pollen-grains simple. Capsule 3-celled.

1. **Clethra.** Sepals and petals 5. Stamens 10. Style 3-cleft at the apex.

Tribe II. PYRÒLEAE. Herbaceous or nearly so, with evergreen foliage. Pollen-grains compound. Capsule 5(rarely 4)-celled.

2. **Chimaphila.** Stems leafy. Flowers corymbed or umbeled. Petals widely spreading. Style very short and top-shaped. Valves of the capsule smooth on the edges.
3. **Moneses.** Scape 1-flowered. Petals widely spreading. Style straight, exserted; stigma 5-rayed. Valves of the capsule smooth on the edges.
4. **Pyrola.** Acaulescent. Flowers in a raceme. Petals not widely spreading. Filaments awl shaped. Style long. Valves of the capsule cobwebby on the edges.

Subfamily II. MONOTROPOÍDEAE (Indian Pipe Subfamily)

Flowers nearly as in Subfamily I or III, but the plants herbaceous, root-parasitic or saprophytic, entirely destitute of green foliage, and with the aspect of Beech Drops. Seeds as in Subfamily I.

* Corolla of 4 or 5 separate petals; calyx imperfect or bract-like.

5. **Monotropa.** Petals narrow. Anthers kidney-shaped, opening across the top.

* * Corolla gamopetalous; anthers 2-celled.

6. **Pterospora.** Corolla ovoid, 5-toothed. Anthers 2-awned on the back, opening lengthwise.
7. **Monotropsis.** Corolla broadly bell-shaped, 5-lobed. Anthers opening at the top.

Subfamily III. ERICOÍDEAE (Heath Subfamily)

Calyx free from the ovary. Corolla gamopetalous, rarely polypetalous, hypogynous. — Shrubs or small trees.

Tribe I. RHODODENDREAE. Fruit a septicidal capsule. Corolla deciduous.

* Flowers developed from scaly buds.

+ Scales or bracts caducous; anther-cells opening by a hole or chink at the top.

8. **Ledum.** Corolla regular, all 5 petals nearly separate. Stamens 5–10. Leaves evergreen.
9. **Rhododendron.** Flowers usually 5-merous. Corolla bell-shaped or funnel-form, lobed or parted, often somewhat irregular. Leaves deciduous or evergreen.
10. **Menziesia.** Corolla globular-bell-shaped, 4-toothed. Stamens 8. Leaves deciduous.

+ + Bud-scales firm and persistent; anther-cells opening lengthwise; leaves evergreen.

11. **Leiophyllum.** Corolla of 5 separate petals. Stamens 10, exserted.
12. **Loiseleuria.** Corolla deeply 5-cleft. Stamens 5, included.

* * Flowers not from scaly buds; the bracts leaf-like or coriaceous.

13. **Kalmia.** Corolla broadly bell-shaped or wheel-shaped, with 10 pouches receiving as many anthers. Leaves oblong or linear.
14. **Phyllodoce.** Corolla ovoid or urn-shaped. Leaves narrow and heath-like.

Tribe II. ANDROMÈDEAE. Fruit a loculicidal capsule (berry-like in no. 22). Corolla deciduous.

* Calyx dry, not becoming fleshy after flowering.

+ Anther-cells opening only at the top; corolla not salver-shaped.

+ + Corolla campanulate, 4–5-lobed or -parted; heath-like, with acerose imbricated leaves.

15. **Cassiope.** Calyx of ovate imbricated sepals. Capsule globular-ovoid, 4–5-valved, the valves 2-cleft.

++ ++ Corolla urceolate to cylindrical, 5-toothed; not heath-like.

16. **Leucothoë.** Calyx slightly or much imbricated, naked or bibracteate. Corolla ovoid or cylindraceous. Capsule depressed, 5-lobed, the valves entire.

17. **Andromeda.** Calyx valvate and very early open, naked. Anthers 2–4-awned. Capsule depressed-globose to obovoid, not thickened at the sutures. Seeds mostly hanging on the central placenta.

18. **Lyonia.** Calyx, etc., much as in *Andromeda*. Anthers awnless. Capsule 5-angled, the sutures with corky or spongy thickenings.

19. **Chamaedaphne.** Calyx of rigid imbricated ovate sepals, bibracteate. Corolla cylindraceous. Capsule splitting when ripe into an outer and inner layer, the inner of 10 valves.

20. **Oxydendrum.** Calyx short, early open, naked. Capsule slender-pyramidal. Seeds all ascending. A small tree.

+ + Anther-cells opening through their whole length, not appendaged.

21. **Epigaea.** Corolla salver-shaped. Calyx of 5 separate dry and pointed sepals.

* * Calyx becoming enlarged and berry-like in fruit.

22. **Gaultheria.** Calyx 5-cleft, in fruit inclosing the capsule. Anthers 4-awned at top.

Tribe III. **ARBÙTEAE.** Fruit indehiscent, a berry or drupe. Corolla deciduous.

23. **Arctostaphylos.** Corolla urn-shaped. Drupe berry-like, 5–10-seeded.

Tribe IV. **ERÍCEAE.** Corolla persistent, becoming scarious. Capsule septicidal.

24. **Calluna.** Corolla bell-shaped, 4-parted. Leaves minute, opposite, imbricate.

Subfamily IV. VACCINOÍDEAE (Whortleberry Subfamily)

Calyx-tube adherent to the ovary, which forms an edible berry or berry-like fruit, crowned with the short calyx-teeth. Anther-cells opening at the apex. — Shrubs or somewhat woody plants, with scaly buds.

25. **Chiogenes.** Berry 4-celled, many seeded, its summit free. Anther-cells not prolonged into a tube, but each 2-pointed. Slender trailing evergreen.

26. **Gaylussacia.** Ovary 10-celled, with a single ovule in each cell. Fruit a berry-like drupe with 10 small seed-like nutlets.

27. **Vaccinium.** Berry 4–5-celled (or imperfectly 8–10-celled by false partitions), many-seeded. Anther-cells tapering upward into a tube.

1. CLÈTHRA [Gronov.] L. White Alder

Sepals imbricated in the bud. Petals obovate-oblong. Anthers arrow-shaped, erect in the bud, becoming inverted. Style slender. Capsule 3-valved, many-seeded, inclosed in the calyx. — Shrubs or trees, with alternate serrate deciduous leaves, and white flowers in terminal hoary racemes. Bracts deciduous. (Κλήθρα, the ancient Greek name of the Alder, which this genus somewhat resembles in foliage.)

1. **C. alnifòlia** L. (Sweet Pepperbush.) Shrub 1–3 m. high; *leaves* 3.5–7 cm. long, *wedge-obovate, sharply serrate*, entire toward the base, prominently straight-veined, smooth, green both sides; *racemes upright*, usually panicled; petals white, rarely pink; *bracts shorter than the flowers;* filaments smooth. — Wet copses, Me. to Fla., mostly near the coast. July–Sept.

2. **C. acuminàta** Michx. A tall shrub or small tree; *leaves oval or oblong, pointed*, thin, finely serrate, 7–15 cm. long, pale beneath; *racemes solitary, flexuous or drooping; bracts longer than the flowers;* filaments and pods hairy. — Woods in the Alleghenies, Va. to Ga. July, Aug.

2. CHIMÁPHILA Pursh. Pipsissewa

Petals 5, concave, orbicular. Stamens 10; filaments enlarged and hairy in the middle; anthers as in *Pyrola*, but more or less conspicuously 2-horned Style nearly immersed in the depressed summit of the globular ovary; stigma

broad and orbicular, disk-shaped, the border 5-crenate. Capsule, etc., as in *Pyrola*, but splitting from the apex downward. — Low nearly herbaceous plants, with long running underground shoots, and thick shining leaves, somewhat whorled or scattered along the short ascending stems; the flowers pink or roseate, on a terminal peduncle. (Name from χεῖμα, *winter*, and φιλεῖν, *to love*, in allusion to one of the popular names, viz. *Wintergreen*.)

1. **C. umbellàta** (L.) Nutt. (PRINCE'S PINE, PIPSISSEWA.) Leafy, 1–4 dm. high; *leaves wedge-lanceolate*, sharply serrate, *not spotted;* peduncles 2–8-flowered; petals flesh-color; anthers violet. — Dry woods, N. S. to Ga., w. to the Pacific. July, Aug. (Mex., Eurasia.)

2. **C. maculàta** (L.) Pursh. (SPOTTED WINTERGREEN.) Stem 1–2.5 dm. high; *leaves lanceolate or ovate-lanceolate, obtuse at the base*, remotely toothed, *the upper surface variegated with white;* peduncles 1–5-flowered. — Dry woods, Mass. to Ont., Minn., and southw June, July

3. MONÈSES Salisb. ONE-FLOWERED PYROLA

Petals 5, orbicular. Filaments awl-shaped, naked; anthers as in *Pyrola*, but conspicuously 2-horned. Stigma large, peltate, with 5 narrow and conspicuous radiating lobes. (Flowers occasionally tetramerous.) — Intermediate between *Pyrola* and *Chimaphila*. (Name formed of μόνος, *single*, and ἧσις, *delight*, from the pretty solitary flower.)

1. **M. uniflòra** (L.) Gray. A small perennial; the rounded and veiny serrate thin leaves, 1–3 cm. long, clustered at the ascending apex of creeping subterranean shoots; the 1–2-bracted scape, 3–13 cm. high, bearing a fragrant waxy-white or rose-colored terminal flower 1–2 cm. wide. (*M. grandiflora* S. F. Gray.) — Deep cold woods, Lab. to Alaska, s. to Pa., Mich., Minn., and in the Rocky Mts. June, July. (Eurasia.)

4. PÝROLA [Tourn.] L. WINTERGREEN. SHIN LEAF

Calyx 5-parted, persistent. Petals 5, concave and more or less converging, deciduous. Stamens 10; filaments naked; anthers extrorse in the bud, but in the flower inverted by the inflexion of the apex of the filament, more or less 4-celled, opening by a pair of pores at the blunt or somewhat 2-horned base (by inversion the apparent apex). Stigma 5-lobed or 5-rayed. Capsule depressed-globose, 5-lobed, 5-valved from the base upward (loculicidal). Seeds minute, innumerable, resembling sawdust, with a very loose cellular-reticulated coat. — Low and smooth perennial herbs, with running subterranean shoots, bearing a cluster of roundish petioled evergreen basal leaves, and a simple raceme of nodding flowers, on an upright more or less scaly-bracted scape. (Name a diminutive of *Pyrus*, the Pear-tree, from some fancied resemblance in the foliage.)

* *Style straight, much narrower than the peltate 5-rayed stigma; petals and stamens erect and connivent; anthers not narrowed below the openings.*

1. **P. minor** L. Scape 0.5–2 dm. high; *leaves roundish*, slightly crenulate, thickish, mostly longer than the margined petiole; flowers small, crowded, white or rose-color; calyx-lobes triangular-ovate, very much shorter than the nearly *globose corolla; style short and included.* — Cold woods, Lab. to Alaska, s. to N. S., N. B., n. N. E., Mich., Minn., etc. (Eurasia.)

2. **P. secúnda** L. Subcaulescent, 1–2.5 dm. high; *leaves ovate*, mucronate, longer than the petiole, scattered, *crenate-serrate;* racemes dense and spike-like, the numerous small greenish-white *flowers all turned to one side*, scarcely nodding; calyx-lobes ovate, very much shorter than the oblong-oval petals; *style long, exserted.* — Rich woods, Lab. to Alaska, s. to Md., Mich., Neb., etc. June–Aug. (Eurasia.)

Var. **obtusàta** Turcz. is a smaller plant, with thin pale rounded leaves more crenulate, and a 3–8-flowered scape of whiter flowers. (Var. *pumila* Gray.) —

Peat-bogs and cold mossy woods, s. to N. S., n. and w. N. E., mts. of Pa., Mich., etc. (Asia.)

* * *Style strongly declined, the apex curved upward, longer than the connivent or spreading petals; stigma much narrower than the truncate excavated ring-like apex of the style; anthers contracted below the openings, forming a short neck; leaves denticulate or entire.*

← *Petals white or greenish-white.*

3. **P. chlorántha** Sw. *Leaves small* (rarely 3 or 4 cm. long), *roundish, thick, dull, shorter than the petiole, or even wanting; scape few-flowered,* naked or with a single small bract, 0.5–3 dm. high; *calyx-lobes roundish-ovate, very short;* the elliptical obtuse petals converging, greenish-white; *anther-cells contracted into a distinct neck;* style little exserted. — Open woods, Lab. to B. C., s. to D. C., Ill., Mich., Wisc., etc. June, July. (Eu.)

P. OXYPÉTALA Aust., described in 1867 from a wooded hill near Deposit, Delaware Co., N. Y., has not since been collected. It was probably an anomalous development of no. 3, in which the leaves and petals were acute or even subacuminate.

4. **P. ellíptica** Nutt. (SHIN LEAF.) *Leaves thin and dull, elliptical or obovate-oval, longer than the margined petiole;* raceme many-flowered; *calyx-lobes ovate, acute, not one fourth the length of the* obovate rather spreading whitish *petals; anther-cells blunt.* — Dry woods and thickets, e. Que. to B. C., s. to D. C., Ill., Mich., Wisc., Ia., etc. June, July.

5. **P. americàna** Sweet. *Leaves orbicular to broadly elliptic, thick, shining,* usually as short as the petiole; scape bracted, 1–3.5 dm. high; raceme elongated, many-flowered; *calyx-lobes lanceolate or oblong-lanceolate,* acutish, with somewhat spreading tips, *one half or one third the length of the* roundish-obovate rather spreading thick white *petals; corolla* 1.5–2 *cm. broad;* anther-cells mucronate. (*P. rotundifolia* Man. ed. 6, not L.) — Open or sandy woods, P. E. I. and N. S. to S. Dak. and Ga. June–Aug.

← ← *Petals pink or rose-purple.*

6. **P. asarifòlia** Michx. *Leaves transversely broad-elliptic or round-reniform, cordate,* coriaceous, *glossy;* scapes 1–3 dm. high, bracted; *raceme loose, elongated,* the *flowers* 1–1.5 *cm. broad;* calyx-lobes ovate or ovate-triangular. (*P. rotundifolia*, var. Hook.) — Alluvial woods and swamps, e. Que. to Yukon, s. to N. S., n. N. E., n. N. Y., n. Mich., and Col. June-Aug. (Asia.) Passing to

Var. **incarnàta** (Fisch.) Fernald. *Leaves obovate to suborbicular, rounded at base, rather dull;* scapes 1–5 dm. high. (*P. uliginosa* Torr.) — Bogs and mossy woods, Nfd. to Alaska, s. to n. N. E., centr. N. Y., Mich., Wisc., Col., and Cal. (Asia.)

5. MONÓTROPA L. INDIAN PIPE. PINESAP

Calyx of 2–5 lanceolate bract-like scales, deciduous. Corolla of erect spatulate or wedge-shaped scale-like petals, which are gibbous or saccate at the base, and tardily deciduous. Stamens 8 or 10; filaments awl-shaped; anthers becoming 1-celled. Style columnar; stigma disk-like, 4–5-rayed. Capsule ovoid, 8–10-grooved, 4–5-celled, loculicidal; the very thick placentae covered with innumerable minute seeds, which have a very loose coat. — Low and fleshy herbs, tawny, reddish, or white, parasitic on roots, or growing on decomposing vegetable matter; the clustered stems springing from a ball of matted fibrous rootlets, furnished with scales or bracts in place of leaves, 1–several-flowered; the summit at first nodding, in fruit erect. (Name composed of *μόνος*, *one*, and *τρόπος*, *turn*, the summit of the stem being turned to one side.)

§ 1. EUMONÓTROPA Gray. *Plant inodorous, 1-flowered; calyx of 2–4 irregular scales or bracts; anthers transverse, opening equally by 2 chinks; style short and thick.*

1. **M. uniflòra** L. (INDIAN PIPE, CORPSE PLANT.) Smooth, waxy-white, flesh-color, or rarely deep red, turning blackish in drying. 0.5–3 dm. high;

stigma naked. — Dark and rich woods, nearly throughout the continent. June-Aug. (Mex., Asia.)

§ 2. HYPÓPITYS [Dill.] Gray. *Plant commonly fragrant; flowers several in a scaly raceme, the terminal one usually 5-merous, the rest 3–4-merous; bract-like sepals mostly as many as the petals; anthers opening by a continuous line into 2 very unequal valves; style longer than the ovary, hollow.*

2. **M. Hypópitys** L. (PINESAP, FALSE BEECH DROPS.) Somewhat pubescent or downy, tawny, whitish, or red, 1–4 dm. high; pod globular or ovoid; stigma ciliate. (*Hypopitys* Small; *H. lanuginosa* Nutt.; *H. americana* Small.) — Rich woods. June–Oct. (Mex., Eurasia.)

6. PTERÓSPORA Nutt. PINE DROPS

Calyx 5-parted. Corolla ovate, urn-shaped, persistent. Stamens 10. Style short; stigma 5-lobed. Capsule globose, depressed, 5-lobed, 5-celled, loculicidal, but the valves cohering with the columella. Seeds very numerous, ovoid, tapering to each end, the apex expanded into a broad reticulated wing many times larger than the body of the seed. — A stout and simple purplish-brown clammy-pubescent root-parasitic herb, 3–9 dm. high; the wand-like stem furnished towards the base with scattered lanceolate scales in place of leaves, above bearing many nodding white flowers, in a long bracted raceme. (Name from πτερόν, *a wing*, and σπορά, *seed*, alluding to the singular wing borne by the seeds.)

1. **P. andromedèa** Nutt. — Hard clay soil, parasitic apparently on the roots of pines, P. E. I. to B. C., s. to Pa., Mich., and in the mts. to Mex.; rare. June–Aug.

7. MONOTRÓPSIS Schwein. SWEET PINESAP

Calyx of 5 oblong-lanceolate acute scale-like sepals, erect, persistent. Corolla persistent, rather fleshy, slightly 5-gibbous at the base. Stamens 10; anthers much shorter than the filaments, fixed near the summit, awnless, with two sac-shaped cells. Capsule ovoid, 5-celled, with a short and thick style, and a large 5-angular stigma. Seeds innumerable. — A low and smooth brownish plant, 0.5–1 dm. high, with the aspect of *Monotropa*, scaly-bracted, the flowers several in a terminal spike, at first nodding, flesh-color, with the fragrance of violets. (Name from *Monotropa* and ὄψις, *appearance*, from resemblance to that genus.) SCHWEINITZIA Ell.

1. **M. odoràta** Ell. — In woods, Md. to N. C. Apr., May

8. LÈDUM L. LABRADOR TEA

Calyx 5-toothed, very small. Corolla of 5 obovate and spreading petals. Capsule 5-celled, splitting from the base upward, many-seeded; placentae borne on the summit of the columella. — Low shrubs, with the alternate entire leaves clothed with rusty wool underneath, persistent, the margins revolute; herbage fragrant when bruised. Flowers white, small, in terminal umbel-like clusters. (Λῆδον, the ancient Greek name of the *Cistus*.)

1. **L. groenlándicum** Oeder. Erect, 1 m. or less high; *leaves oblong or linear-oblong*, 2–5 cm. long, very obtuse; *stamens* 5–7; *capsule slender, subcylindric*, acutish. (*L. latifolium* Ait.) — Bogs, damp thickets, and mountain-slopes, common northw., s. to Ct., N. J., Pa., Mich., Wisc., Minn., etc. May, June, rarely to Aug. (Greenl.)

2. **L. palústre** L. Lower, at most 6 dm. high; *leaves narrowly linear*, 1–3 cm. long; *stamens mostly* 7–11; *capsule ellipsoid-ovoid.* — Arctic regions, s. to Nfd.

Var. dilatàtum Wahlenb. *Leaves* broader, *linear-oblong*, **1–4** cm. long.—Nfd., e. Que., Mt. Katahdin, Me., and apparently on the Great Lakes, and northw. (Eurasia.)

9. RHODODÉNDRON L.

Calyx mostly small or minute. Stamens sometimes as few as the corolla-lobes, more commonly twice as many, usually declined; anther-cells opening by a round terminal pore. Capsule 5-celled, 5-valved, many-seeded. Seeds scale-like.—Shrubs or small trees, of diverse habit and character, with chiefly alternate entire leaves, and large and showy flowers in umbeled clusters from terminal buds. (Ῥοδόδενδρον, *rose-tree;* the ancient name.)

§ 1. AZÀLEA (L.) Planch. *Leaves deciduous, glandular-mucronate; stamens* (5–10) *and style more or less exserted and declined.*

* *Flower-buds of numerous much imbricated scales; corolla with conspicuous funnel-form tube; stamens* (*chiefly* 5) *and style long-exserted;* 0.6–6 *m. high, with leaves obovate to oblong-oblanceolate.*

← *Flowers appearing after the leaves.*

1. **R. arboréscens** (Pursh) Torr. (Smooth Azalea.) *Branchlets smooth; leaves* obovate, obtuse, *very smooth both sides, shining above*, glaucous beneath, the margins bristly-ciliate; *calyx-lobes long and conspicuous;* corolla slightly clammy, rose-colored, fragrant. (*Azalea* Pursh.)—Mts. of Pa., southw. June.

2. **R. viscòsum** (L.) Torr. (Clammy Azalea, White Swamp Honeysuckle.) *Branchlets bristly*, as well as the margins and midrib of the oblong-obovate otherwise smooth leaves; *calyx-lobes minute; corolla clammy, the tube much longer than the lobes.* (*Azalea* L.)—Swamps, mostly near the coast, Me. to O., Ark., and southw. June, July. Var. glaúcum (Michx.) Gray. Leaves paler, often white-glaucous underneath or on both sides, sometimes rough-hairy.—N. E. to Va. Var. nítidum (Pursh) Gray. Dwarf, with oblanceolate leaves green both sides.—N. E. to Va.

← ← *Flowers appearing before or with the leaves.*

3. **R. nudiflòrum** (L.) Torr. (Purple A., Pinxter Flower.) *Leaves oblanceolate to obovate, sparingly pubescent, or glabrate except on the ciliolate margins and strigose midrib (beneath); pedicels strigose-hairy; corolla* flesh-color, pink or purple, the *tube strigose* or slightly glandular, scarcely longer than the ample lobes; *capsule strigose*, 1.5–3 *cm. long.* (*Azalea* L.)—Open woods and swamps, Mass. to Fla. and Tex.; locally n. in Miss. basin to Union Co., Ill. (*Gleason.*) May, June.

4. **R. canéscens** (Michx.) G. Don. Similar; *leaves ovate, obovate, or elliptic, softly pubescent beneath*, especially when young; *pedicels, corolla-tube, and capsule* (1.2–1.8 *cm. long*) *glandular.* (*Azalea* Michx.)—Woods and gravelly shores, N. H. to N. Y., and southw. May, June.—Sometimes too near the preceding species.

5. **R. calendulàceum** (Michx.) Torr. (Flame-colored A.) Leaves hairy; *tube of the corolla shorter than the lobes, hairy.* (*Azalea* Michx.; *A. lutea* L., not *R. luteum* Sweet.)—Woods, s. N. Y. and mts. of Pa. to Ga. May.—Covered as the leaves appear with large orange blossoms, usually turning to flame-color, not fragrant.

* * *Flower-buds of fewer and early caducous scales; corolla irregular* (*usually earlier than the leaves*), *with short or hardly any tube, anteriorly divided to the base; the limb equaling the* 10 *stamens and style.*

6. **R. canadénse** (L.) BSP. (Rhodora.) Shrub, 1 m. or less high; young parts sparingly strigose-hairy; leaves oblong, pale, more or less pubescent; corolla rarely 2 cm. long, purplish-rose-color (rarely white), bilabiate, with the posterior lip 3-lobed, the anterior of 2 oblong-linear and recurving nearly or quite distinct petals. (*Rhodora* L.; *Rhododendron Rhodora* Gmel.)—Swamps and damp slopes, Nfd. to w. Que., Pa. and N. J. May, June (rarely July).

§ 2. EURHODODÉNDRON DC. *Leaves coriaceous and persistent; stamens (commonly 10) and style rarely exserted, somewhat declined, or sometimes equally spreading.*

7. R. máximum L. (Great Laurel.) Shrub or tree, 2–10 m. high; *leaves* 0.8–2 dm. long, very thick, *elliptical-oblong*, or lance-oblong, *acute*, *narrowed toward the base*, *very smooth*, with somewhat revolute margins; pedicels viscid; corolla bell-shaped, 3.5–5 cm. broad, pale rose-color or nearly white, greenish in the throat on the upper side, and spotted with yellow or reddish. — Damp deep woods, rare from N. S., Me., and Que. to Ont. and O., but very common through the Alleghenies from N. Y. to Ga. June, July.

8. R. catawbiénse Michx. (Mountain Rose Bay.) *Leaves oval or oblong, rounded at both ends, smooth*, pale beneath, 0.5–1.5 cm. long; corolla broadly bell-shaped, lilac-purple; pedicels rusty-downy. — High Alleghenies, Va. to Ga. June.

9. R. lappónicum (L.) Wahlenb. (Lapland Rose Bay.) *Dwarf*, prostrate in broad tufts; *leaves* 0.5–1.5 *cm. long*, *elliptical*, *obtuse*, *dotted* (like the branches) with rusty scales; umbels few-flowered; corolla open bell-shaped, dotted, violet-purple; *stamens* 5–10. — Alpine summits, N. Y., N. H., and Me. to the Arctic regions. June, July. (Arctic Eurasia.)

10. MENZIÈSIA Sm.

Calyx small and flattish, 4-toothed or 4-lobed. Corolla cylindraceous-urn shaped, soon bell-shaped. Stamens included; anther-cells opening by an oblique pore. Capsule ovoid, woody, 4-celled, 4-valved, many-seeded. Seeds narrow, with a loose coat. — Low shrubs, the straggling branches and the alternate leaves usually hairy and ciliate with rusty rather chaff-like bristles. Flowers small, developed with the leaves, in terminal clusters, greenish-white and purplish, nodding. (Named for *Archibald Menzies*, who in Vancouver's voyage brought the original species from the Northwest Coast.)

1. M. glabélla Gray. Strigose-chaffy scales mostly wanting; *leaves* obovate, barely mucronate-tipped, *glabrous* or nearly so; *filaments ciliate below; capsule glabrous* or nearly so; *seeds long-caudate at each end.* — Minnesota Point, L. Superior, and northwestw. June, July.

2. M. pilòsa (Michx.) Pers. More or less chaffy; *leaves* obovate-oblong, prominently glandular-mucronate, *strigose-hirsute* especially above; *filaments glabrous; capsule beset with short gland-tipped bristles; seeds merely apiculate.* (*M. globularis* Salisb.) — In the Alleghenies from Pa. to Ga. May–July.

11. LEIOPHÝLLUM Pers. Sand Myrtle

Calyx 5-parted. Corolla of obovate-oblong petals, spreading. Style filiform. Capsule 2–3-celled, splitting from the apex downward, many-seeded. — A low much branched evergreen, with the aspect, foliage, etc., of *Ledum*, but the crowded leaves sometimes opposite, scarcely petioled. Flowers small, white, in terminal umbel-clusters. (Name formed of λεῖος, *smooth*, and φύλλον, *leaf*.) Dendrium Desv.

1. L. buxifòlium (Berg.) Ell. Shrub, 1–9 dm. high; leaves oval or oblong, smooth and shining, 6–13 mm. long. — Sandy pine barrens, N. J. to Fla. May, June.

12. LOISELEÙRIA Desv. Alpine Azalea

Calyx 5-parted, nearly as long as the bell-shaped regular corolla. Stamens not declined. Style short. Capsule ovoid, 2–3-celled, many-seeded, 2–3-valved; valves 2-cleft from the apex; placentae borne on the middle of the columella. — A small depressed shrubby evergreen, much branched and tufted, smooth, with coriaceous opposite elliptical leaves, on short petioles, with revolute margins. Flowers small, white or rose-color, 2–5 in a cluster. (Named for *J. L. A. Loiseleur-Delongchamps*, a French botanist.) Chamaecistus Oeder.

1. L. procúmbens (L.) Desv. — Alpine summits, N. H., Me., and Que.; and in humus, Bay of Fundy, N. S., Nfd., and northw. June, July. (Eurasia.)

13. KÁLMIA L. Laurel (of America)

Calyx 5-parted. Corolla 5-lobed. Filaments long and thread-form. Capsule globose, 5-celled, many-seeded. — Evergreen mostly smooth shrubs, with alternate or opposite entire coriaceous leaves, naked buds, and showy flowers. (Dedicated to *Peter Kalm*, a pupil of Linnaeus, who traveled in America.)

§ 1. *Flowers in simple or clustered naked umbel-like corymbs; pedicels from the axils of small and firm foliaceous persistent bracts; calyx smaller than the pod, persistent; leaves and branches glabrous, or nearly so.*

1. K. latifòlia L. (Mountain L., Calico Bush, Spoon-wood.) *Leaves mostly alternate, bright green both sides, ovate-lanceolate* or oblong, acute at each end, petioled; *corymbs terminal*, many-flowered, clammy-pubescent; *flowers* 1.5–2.5 *cm. broad, pink or white;* pod depressed, glandular. — Rocky hills and damp soil, N. B. to Ont., and southw. Usually a shrub, but in the mts. from Pa. southw., often tree-like. May–July.

2. K. angustifòlia L. (Sheep L., Lambkill, Wicky.) Shrub rarely 1 m. high; *leaves commonly opposite or in threes, pale and glabrate underneath, bright green above, narrowly oblong*, obtuse, petioled; *corymbs lateral* (appearing later than the shoots of the season), slightly glandular, many-flowered; *flowers rarely* 1 *cm. broad, crimson; calyx glandular;* pod depressed, nearly smooth; *pedicels recurved in fruit.* — Hillsides, pastures, and bogs, Lab. to Ont., and southw. June, July.

3. K. carolìna Small. Similar; *leaves permanently pale-puberulent beneath; calyx puberulent, not glandular.* — Swamps and woods, Va. to S. C. May, June.

4. K. polifòlia Wang. (Pale L.) Straggling, 1–6 dm. high; *branchlets* 2-*edged; leaves opposite, nearly sessile, oblong, white-glaucous beneath, with revolute margins; corymbs terminal, few-flowered, smooth;* bracts large; *flowers* 1–2 *cm. broad, rose-purple;* pod ovoid, smooth. (*K. glauca* Ait.) — Cold bogs and mts., Lab. to Alaska, s. to N. J., Pa., Mich., Minn., and Cal. May–July.

§ 2. *Flowers scattered, solitary in the axils; calyx leafy, larger than the pod, nearly equaling the corolla, deciduous; leaves and branches bristly-hairy.*

5. K. hirsùta Walt. Shrub 2–6 dm. high; branches terete; leaves oblong or lanceolate, 0.5–1 cm. long, becoming glabrous; corolla rose-color. — Sandy pine barren swamps, Va. to Fla. May–Aug.

14. PHYLLÓDOCE Salisb.

Corolla 5-toothed. Stamens 10, anthers pointless, shorter than the filaments. Capsule 5-celled, 5-valved, many-seeded. — Low alpine heath-like evergreen undershrubs, clothed with crowded linear and obtuse rough-margined leaves. Flowers nodding on solitary or umbeled peduncles at the summit of the branches. — Sometimes united with *Bryanthus*, a Siberian genus with 4-parted umbeled flowers. (*Phyllodoce*, a sea-nymph mentioned by Virgil.)

1. P. coerùlea (L.) Bab. Calyx pubescent; corolla cylindric-urn-shaped, 5-toothed, purplish, smooth; style included. (*Bryanthus taxifolius* Gray.) — Arctic Am., s. to alpine summits of Me. and N. H. June–Aug. (Eurasia.) — Corolla turning bluish in drying.

15. CASSÌOPE D. Don.

Calyx without bractlets, of 4 or 5 nearly distinct ovate sepals, imbricated in the bud. Corolla open-campanulate, 4–5-lobed or -cleft. Stamens 8 or 10; anthers fixed by the apex; the ovoid cells each opening by a large terminal pore,

and bearing a long recurved awn behind. Capsule 4–5-celled; placentae many-seeded, pendulous from the summit of the columella. Seeds smooth and wingless. — Small arctic or alpine evergreen plants, with scale-like or needle-like leaves, and solitary white or rose-colored flowers nodding on slender erect peduncles. (Named for *Cassiope*, mother of *Andromeda*.)

1. **C. hypnoìdes** (L.) D. Don. Tufted and procumbent, moss-like, 1–12 cm. high; leaves needle-shaped, loosely imbricated; corolla 5-cleft; style short and conical. — Alpine summits, Me., N. H., and N. Y., cliffs of L. Superior, and high northw. June, July. (Eurasia.)

16. LEUCÓTHOË D. Don. Fetter Bush

Calyx of 5 nearly distinct sepals, imbricated in the bud. Stamens 10; anthers naked, or the cells with 1 or 2 erect awns at the apex, opening by a pore. Capsule depressed, more or less 5-lobed, 5-celled, 5-valved, the sutures not thickened; the many-seeded placentae borne on the summit of the short columella. Seeds mostly pendulous. — Shrubs with petioled and serrulate leaves, and white scaly-bracted flowers in dense axillary or terminal spiked racemes. (*Leucothoë*, daughter of Orchamus, King of Babylonia, referred to by Ovid.)

* *Anthers awnless; stigma 5-rayed; racemes sessile, dense, with persistent bracts, in the axils of thick and shining evergreen leaves; calyx not bracteolate.*

1. **L. axillàris** (Lam.) D. Don. *Leaves lanceolate-oblong or oval, abruptly pointed* or acute, somewhat spinulose-serrulate, *on very short petioles; sepals broadly ovate.* — Low grounds, Va. to Fla. and Ala. Feb.–Apr.

2. **L. Catesbaèi** (Walt.) Gray. *Leaves ovate-lanceolate, taper-pointed*, serrulate with ciliate-spinulose appressed teeth, *conspicuously petioled*, 7–15 cm. long; *sepals ovate-oblong*, often acute. — Moist banks of streams, Va. to Ga. along the mts. May. — Shrub 1 m. high, with long spreading or recurved branches. Flowers exhaling the unpleasant scent of Chestnut-blossoms.

* * *Anthers awned; stigma simple; flowers very short-pediceled, in long one-sided racemes mostly terminating the branches; bracts deciduous; leaves membranaceous and deciduous, serrulate; calyx bibracteolate.*

3. **L. recúrva** (Buckley) Gray. *Branches and racemes recurved-spreading*; leaves lanceolate or ovate, taper-pointed; *sepals ovate; anther-cells 1-awned; pod 5-lobed; seeds flat and cellular-winged.* — Dry hills, Alleghenies of Va. to Ala. Apr. — Lower and more straggling than the next.

4. **L. racemòsa** (L.) Gray. *Branches and racemes mostly erect;* leaves oblong or oval-lanceolate, acute; *sepals ovate-lanceolate; anther-cells each 2-awned; pod not lobed; seeds angled and wingless.* — Moist thickets, Mass. to Fla. and La., near the coast. May, June. — Shrub 1–3 m. high. Corolla cylindrical.

17. ANDRÓMEDA L.

Calyx of 5 nearly or partly distinct sepals, valvate in the bud, but very soon separate or open. Corolla urceolate. Stamens 10; filaments unappendaged; anthers fixed near the middle, each cell bearing 1–2 awns. Capsule subglobose, 5-celled, 5-valved, the sutures not thickened; the many-seeded placentae borne on the summit or middle of the columella. — Evergreen shrubs, with umbeled, clustered, or panicled and racemed pink or white flowers. (Fancifully named by Linnaeus for *Andromeda* of Greek mythology.)

* *Anthers awned; capsule more or less globose; leaves thick and evergreen.*

§ 1. EUANDRÓMEDA Gray. *Corolla globose-urceolate; each anther-cell bearing a slender ascending awn; seeds oval, with a smooth and shining crustaceous coat.*

1. **A. Polifòlia** L. Low shrub, with elongate creeping base; stem simple or with ascending branches, 5–30 cm. high; *leaves linear to narrowly oblong,*

either flat or revolute, *glabrous*, generally *whitened beneath with a varnish-like coat, later often green;* bud-scales scarcely glaucous; *pedicels* in terminal umbels, *filiform, straightish*, 2–4 *times exceeding the nodding flower and erect fruit;* corolla pink or white; calyx with pale or usually reddish slightly ascending lobes; *capsule brown or reddish*, obovoid or subglobose, *as high as broad.* — Arctic regious, extending very locally s. to the Adirondack Mts., N. Y.(?), L. Huron, etc. May–July. (Eurasia.) FIG. 844.

844. A. Polifolia. End of fruiting branch × ⅔.

2. **A. glaucophýlla** Link. (BOG ROSEMARY.) Similar in habit; *leaves white beneath with close fine pubescence;* branchlets and *bud-scales glaucous; flowers on thickish curved pedicels rarely twice their length;* calyx-lobes whitish, usually spreading; *capsule depressed, turban-shaped, glaucous.* (*A. Polifolia* mostly of Am. auth., not L.) — Bogs and wet shores, Lab. to Man., s. to N. J., Pa., and Minn. May–July; rarely Sept., Oct. FIG. 845.

845. A. glaucophylla. End of fruiting branch × ⅔.

§ 2. PORTÙNA (Nutt.) Gray. *Corolla ovoid-urceolate; each anther-cell bearing a deflexed awn; seeds scobiform.*

3. **A. floribúnda** Pursh. Very leafy, 5–15 dm. high; *young branchlets, etc., strigose-hairy; leaves* lanceolate-oblong, acute or acuminate, ciliate-serrulate, *glandular-dotted beneath*, 4–6 cm. long; *racemes crowded in short terminal panicles*, densely flowered. (*Pieris* B. & H.) — Moist hillsides, in the Alleghenies from Va. to Ga. May.

18. LYÒNIA Nutt.

Similar to *Andromeda*. Filaments hairy and often toothed or appendaged; anthers oblong, unappendaged. Capsule 5-angled, the dorsal sutures with a thickened ridge, which usually divides in dehiscence of the capsule; the placentae borne both upon the columella and the walls of the cells. Seeds scobiform, with a loose thin testa. — Shrubs with fascicled, racemose, or panicled white flowers. (Named for *John Lyon*, early American botanist and explorer of the southern Alleghenies.)

* *Leaves coriaceous and evergreen.*

1. **L. nítida** (Bartr.) Fernald. (FETTER BUSH.) *Glabrous shrub*, 0.5–1.5 m. high; *branches sharply triangular; leaves glossy*, oblong-ovate to lanceolate, acuminate, entire, *with a conspicuous nerve next the revolute margin; flowers in axillary umbels;* filaments appendaged at summit; *capsule subglobose.* (*Andromeda* Bartr.; *Pieris* B. & H.) — Low woods and barrens, Va. to Fla. and La. May.

* * *Leaves thinnish and deciduous.*

2. **L. mariàna** (L.) D. Don. (STAGGER-BUSH.) *Mostly glabrous*, 5–10 dm. high; leaves oblong or oval, 3.5–8 cm. long; *fascicles of nodding flowers racemose on leafless shoots; filaments 2-toothed near the apex; capsule ovoid-pyramidal, truncate at the contracted apex.* (*Andromeda* L.; *Pieris* B. & H.) — Low grounds, R. I. to Fla., Tenn., and Ark. — Foliage said to poison lambs and calves.

3. **L. ligustrìna** (L.) DC. (MALE BERRY.) *Minutely pubescent*, 0.5–3 m. high; leaves obovate to lanceolate-oblong, 2.5–8.5 cm. long, serrulate or entire, *racemes crowded in* chiefly *naked panicles; filaments flat, not appendaged; capsule globular.* (*Andromeda* Muhl.; *Xolisma* Britton.) — Moist thickets, centr. Me. to centr. N. Y., and southw. June, July.

Var. **foliosiflòra** (Michx.) Fernald. Racemes less crowded, often more elongate, conspicuously leafy-bracted. (*Xolisma foliosiflora* Small.) — Common southw., local and less characteristic northw.

19. CHAMAEDÁPHNE Moench. Leather Leaf. Cassandra

Calyx of 5 distinct acute sepals. Stamens 10; anther-cells tapering into a tubular beak, awnless. Capsule depressed, 5-celled, many-seeded. Seeds flattened, wingless. — Low and much branched shrubs, with nearly evergreen and coriaceous leaves, which are scurfy, especially underneath. Flowers white, in the axils of the upper small leaves, forming small 1-sided leafy racemes. (From χαμαί, *on the ground*, and δάφνη, *laurel*.) Cassandra D. Don.

1. **C. calyculàta** (L.) Moench. Leaves oblong, obtuse, flat. (*Cassandra* D. Don.) — Bogs, Lab. to B. C., s. to Minn., Wisc., Ill., and Ga. Apr., May. (Eurasia.)

20. OXYDENDRUM DC. Sorrel-tree. Sour-wood

Calyx of 5 almost distinct sepals, valvate in the bud. Corolla ovate, puberulent. Stamens 10; anthers fixed near the base, linear, awnless, the cells tapering upward. Capsule 5-celled, 5-valved; the many-seeded placentae at the base of the cells. Seeds slender, the thin and loose reticulated coat extended at both ends into awl-shaped appendages. — A tree with deciduous oblong-lanceolate pointed soon smooth serrulate leaves on slender petioles, and white flowers in long one-sided racemes clustered in an open panicle, terminating the branches of the season. Bracts and bractlets minute, deciduous. Foliage acid (whence the name, from ὀξύς, *sour*, and δένδρον, *tree*).

1. **O. arbòreum** (L.) DC. — Rich woods, from Pa. to Ind., and southw., mostly along the Alleghenies, to Fla. and La. June, July.

21. EPIGAÈA L. Ground Laurel. Trailing Arbutus

Corolla-tube hairy inside, as long as the ovate-lanceolate scale-like nearly distinct sepals. Stamens 10, with slender filaments; anthers oblong. Style slender, its apex (as in *Pyrola*) forming a sort of ring or collar around and partly adnate to the 5 little lobes of the stigma. Capsule depressed-globular, 5-lobed, 5-celled, many-seeded. — A prostrate or trailing scarcely shrubby plant, bristly with rusty hairs, with evergreen and reticulated rounded and heart-shaped alternate leaves on slender petioles, and with rose-colored flowers in small axillary clusters, from scaly bracts. (Name composed of ἐπί, *upon*, and γῆ, *the earth*, from the trailing growth.)

1. **E. rèpens** L. (Mayflower.) — Sandy woods, or in rocky soil, especially in the shade of pines, Nfd. to Sask., Wisc., Mich., Ky., and Fla. — Flowers appearing in early spring, exhaling a rich spicy fragrance, dimorphous as to style and stamens, and subdioecious.

22. GAULTHÈRIA [Kalm] L. Aromatic Wintergreen

Corolla cylindrical-ovoid or a little urn-shaped, 5-toothed. Stamens 10, included. Capsule depressed, 5-lobed, 5-celled, 5-valved, many-seeded, inclosed when ripe by the calyx, which thickens and turns fleshy, so as to appear as a globular red berry! — Shrubs, or almost herbaceous plants, with alternate evergreen leaves and axillary nearly white flowers; pedicels with 2 bractlets. (Dedicated to *Hugues Gaultier* — also spelled *Gaulthier*, *Gauthier*, and *Gautier* — naturalist and court-physician at Quebec, in the middle of the 18th century.)

1. **G. procúmbens** L. (Teaberry, Checkerberry.) Stems slender and extensively creeping on or below the surface; the flowering branches ascending, leafy at the summit, 5–15 cm. high; leaves obovate or oval, obscurely serrate; flowers few, mostly single in the axils, nodding. — Woods and clearings, Nfd. to Man., and southw. July, Aug. — The bright red berries (formed of the calyx) and the foliage have the well known spicy-aromatic flavor of the Sweet Birch.

23. ARCTOSTÁPHYLOS Adans. Bearberry

Corolla with a short revolute 5-toothed limb. Stamens 10, included; anthers with 2 reflexed awns on the back near the apex, opening by terminal pores. — Shrubs, with alternate leaves, and scaly-bracted nearly white flowers in terminal racemes or clusters. (Name composed of ἄρκτος, *a bear*, and σταφυλή, *a bunch of grapes*, the Greek of the popular name.)

1. A. Ùva-úrsi (L.) Spreng. (Bearberry.) Trailing; *leaves thick and evergreen*, obovate or spatulate, *entire*, *smooth*; *fruit red*, inedible. — Rocks and bare hills, N. J. and Pa. to Mo., and far northw. and westw. May. (Eurasia.)

2. A. alpìna (L.) Spreng. (Alpine B.) Depressed; *leaves deciduous*, *serrate*, *wrinkled*, with strong netted veins, obovate; *fruit black*, juicy and edible. (*Mairania* Desv.) — Arctic Am., s. to alpine summits of Me. and N. H. (Arctic-alpine Eurasia.)

24. CALLÙNA Salisb. Heather. Ling

Calyx of 4 colored sepals. Corolla much shorter and less conspicuous than the calyx, both becoming scarious and persistent. Stamens 8, distinct; anthers with a pair of deflexed appendages on the back, the cells opening each by a long chink. Capsule 4-celled, 4-valved. — Evergreen undershrub, with no scaly buds, opposite and minute leaves (mostly extended at base into 2 sharp auricles), crowded and imbricated on the branches. Flowers axillary, or terminating very short shoots and crowded on the branches, forming close mostly one-sided spikes or spike-like racemes, rose-colored or sometimes white, small, bracted by 2 or 3 pairs of leaves, the innermost of which are more or less scarious. (Named from καλλύνειν, *to brush* or *sweep*, brooms being made of its twigs.)

1. C. vulgàris (L.) Hull. — Low grounds, in the coastal region, very locally from R. I. to Nfd.; probably introduced from Eu.

Two European heaths, Erìca cinèrea L. and E. Tétralix L., have been found slightly established in small patches on Nantucket I., Mass.

25. CHIÓGENES Salisb. Creeping Snowberry

Calyx-limb 4-parted, persistent. Corolla bell-shaped, deeply 4-cleft. Stamens 8, included, inserted on an 8-toothed disk, filaments very short and broad, anther-cells ovate-oblong, separate, not awned on the back, but each minutely 2-pointed at the apex, and opening by a large chink down to the middle. Berry white, globular. — A trailing and creeping evergreen, with very slender and scarcely woody stems, and small Thyme-like ovate and pointed leaves on short petioles, with revolute margins, smooth above, the lower surface and the branches beset with rigid rusty bristles. Flowers very small, solitary in the axils, on short nodding peduncles, with 2 large bractlets under the calyx. (Name from χιών, *snow*, and γένος, *offspring*, in allusion to the snow-white berries.)

1. C. hispídula (L.) T. & G. (Moxie Plum, Capillaire.) Leaves 0.5–1 cm. long; berries 5–7 mm. thick, bright white, delicately acid and aromatic. (*C. serpyllifolia* Salisb.) — Peat-bogs and mossy woods, Lab. to B. C., s. to Minn., Mich., and N. C. May. — Plant with the aromatic flavor of *Gaultheria* or of Sweet Birch.

26. GAYLUSSÀCIA HBK. Huckleberry

Corolla tubular, ovoid, or bell-shaped; the border 5-cleft. Stamens 10; anthers awnless; cells tapering upward into more or less of a tube, opening by a chink at the end. Fruit a berry-like drupe, containing 10 seed-like nutlets. — Branching shrubs, with the aspect of *Vaccinium*, commonly sprinkled with resinous dots; the flowers (pale, tinged with purple or red) in lateral and bracted racemes. (Named for the chemist, *Gay-Lussac*.)

** Leaves thick and evergreen, somewhat serrate, not resinous-dotted.*

1. **G. brachýcera** (Michx.) Gray. (Box H.) Very smooth, 2–4 dm. high; leaves oval, finely crenate-toothed; racemes short and nearly sessile; pedicels very short; corolla cylindrical-bell-shaped. — Wooded hills, Perry Co., Pa., to Del. and Va. May. — Leaves resembling those of the Box.

*** Leaves deciduous, entire, sprinkled more or less with resinous or waxy atoms.*

2. **G. dumòsa** (Andr.) T. & G. (Dwarf H.) *Somewhat hairy* and glandular, low, 2–15 dm. high, from a creeping base, bushy; *leaves* obovate-oblong, *mucronate, green both sides*, rather thick and shining when old; racemes elongated; *bracts leaf-like, oval, persistent, as long as the pedicels; ovary bristly or glandular;* corolla bell-shaped; fruit black. — Sandy swamps, Nfd. to Fla. and La., mostly on the coastal plain. June.

Var. **hirtélla** (Ait. f.) Gray. Young branchlets, racemes, and often the leaves bristly-hairy. — Va. to Fla., etc.

3. **G. frondòsa** (L.) T. & G. (Blue Tangle, Dangleberry.) Slender, 5–1.5 dm. high; branches smooth, divergent; *leaves* obovate-oblong, *blunt, pale, finely pubescent and glaucous beneath*, in maturity 2.5–6.5 cm. long, 1.5–3 cm. broad; racemes slender, loose; *bracts oblong or linear, deciduous, shorter than the slender drooping pedicels;* corolla globular-bell-shaped; fruit dark blue with a white bloom, sweet and edible. — Low copses, coast of N. H. to O. and La. May, June.

4. **G. ursìna** (M. A. Curtis) T. & G. (Bear H.) Similar; branches smooth or slightly hairy; *leaves green both sides*, thin, oblong to lance-obovate, *acuminate*, in maturity 5–12 cm. long, 2–4.5 cm. broad; fruit reddish, becoming black, insipid. — Woods, Ky. to N. C. and Ga. May, June.

5. **G. baccàta** (Wang.) C. Koch. (Black H.) Much branched, rigid, *slightly pubescent* when young, 0.3–1 m. high; *leaves* oval, oblong-ovate, or oblong, thickly clothed and at first *clammy, as well as the flowers, with shining resinous globules;* racemes short, clustered, one-sided; pedicels about the length of the flowers; *bracts and bractlets reddish;* corolla ovoid-conical, or at length cylindrical with an open mouth; fruit black, without bloom, pleasant. (*G. resinosa* T. & G.) — Rocky woodlands and swamps, Nfd. to Man., s. to e. Ia., Wisc., Mich., Ill., and Ga. May, June. Forma glaucocárpa (Robinson) Mackenzie. (Blue H.) Fruit blue, with a bloom, generally larger and juicier. — Me. to N. C. Forma leucocárpa (Porter) Fernald. (White H.) Berries white to pinkish, somewhat translucent. — Local, but occasionally abundant and fruitful.

27. VACCÍNIUM L. Blueberry. Cranberry

Corolla various in shape; the limb 4–5-cleft, revolute. Stamens 8 or 10; anthers sometimes 2-awned on the back; the cells opening by a hole at the apex. Berry 4–5-celled, many-seeded, or sometimes 8–10-celled by a false partition stretching from the back of each cell to the placenta. — Shrubs with solitary, clustered, or racemed flowers, in spring or early summer; the corolla white or reddish. (Ancient Latin name, of obscure derivation.)

§ 1. BATODÉNDRON (Nutt.) Gray. *Corolla open-campanulate, 5-lobed; anthers with long tubes, and 2-awned on the back; berry spuriously 10-celled; leaves deciduous but firm; flowers solitary or in leafy-bracted racemes, slender-pediceled.*

** Flowers articulated with the pedicel; anthers included.*

1. **V. arbòreum** Marsh. (Farkleberry.) *Tall* (2–9 m. high), smoothish; leaves obovate to oblong, entire or denticulate, mucronate, bright green, shining above, at the South evergreen; *corolla white;* berries black, globose, small, many-seeded. (*Batodendron* Nutt.; *B. andrachneforme* Small.) — Sandy soil s. Ill. to Tex., Fla., and N. C.

** * Flowers not articulated with the pedicel; anthers exserted.*

+ Leaves and branchlets pubescent.

2. **V. stamíneum** L. (DEERBERRY, SQUAW HUCKLEBERRY.) Diffusely branched, 3–9 dm. high, somewhat pubescent; leaves ovate or oval, pale, glaucous or whitish underneath; *calyx glabrous* or essentially so; *corolla greenish-white or purplish; anthers much exserted; berries greenish or yellowish*, globular or pear-shaped, large, few-seeded, tart. (*Polycodium* Greene; *P. candicans* Small.) — Dry woods and plains, Mass. to Ont., and southw.

3. **V. melanocárpum** Mohr. (SOUTHERN GOOSEBERRY.) Similar, the young parts minutely white-pubescent; *calyx white-tomentose; fruit dark purple, lustrous*, palatable. (*Polycodium* Small.) — Upland woods, N. C. to Mo., and southw.

+ + Leaves and branchlets glabrous.

4. **V. negléctum** (Small) Fernald. *Glabrous* essentially throughout; leaves thin, at most ciliolate, becoming slightly coriaceous, oblong-lanceolate to narrowly obovate, short-acuminate, green to slightly glaucous beneath; calyx glabrous; corolla white or pink; fruit greenish or yellowish, hardly edible. (*Polycodium* Small.) — Dry woods, Va. to Kan., and southw.

§ 2. CYANOCÓCCUS Gray. (BLUEBERRIES.) *Corolla cylindraceous to campanulate, 5-toothed; filaments hairy; anthers included, awnless; berry edible, mostly blue or black, completely or incompletely 10-celled; flowers in fascicles or short racemes, short-pediceled, appearing from large scaly buds with or before the leaves.*

** Leaves coriaceous, evergreen; bracts firm, tardily deciduous.*

5. **V. Myrsinites** Lam. (EVERGREEN B.) Low (2–6 dm. high), with branches puberulent when young; leaves from obovate to oblong-lanceolate or spatulate, 1–3 cm. long, smooth and shining above, puberulent or glabrate and strongly veiny beneath, entire or denticulate; calyx with acute teeth; corolla cylindraceous, 6–8 mm. long; fruit globose, blue-black. — Sandy barrens, Va. to Fla. and La.

** * Leaves deciduous; bracts scaly, early deciduous.*

+ Corolla cylindraceous when developed.

6. **V. virgàtum** Ait. Low, more or less pubescent; leaves ovate-oblong to cuneate-lanceolate, usually acute and minutely serrulate, thinnish, shining at least above, in maturity 2.5–5 cm. long; flower-clusters sometimes virgate on naked branches; corolla rose-color, 7–10 mm. long; berry black. — In swamps and pine barrens, Staten I. and N. J. (according to Mackenzie) to Fla., etc.

Var. **tenéllum** (Ait.) Gray. Lower; the mostly small (1–3 cm. long) leaves and smaller (6–8 mm. long) nearly white flowers in shorter or closer clusters. — Va. to Ill., Mo., and southw.

+ + Corolla globose-urceolate to ellipsoid.

++ Low shrubs, mostly less than 1 m. high.

7. **V. pennsylvánicum** Lam. (LOW SWEET B., EARLY SWEET B.) Dwarf (2–6 dm. high); the green warty stems and branches glabrous (or pubescent northward); *leaves lanceolate or oblong, distinctly serrulate with bristle-pointed teeth* (rarely entire), *bright green, smooth and shining both sides* (or sometimes hairy on the midrib beneath), in maturity 2–3.5 cm. long, 8–15 mm. broad; corolla short (6–7 mm. long), cylindric-bell-shaped; berries bluish-black and glaucous, varying to black or red, either with or without a bloom, and rarely dull white (forma LEUCOCÁRPUM Deane). — Dry hills, barrens, etc., Nfd., to Sask., s. to Va., Ill., and Wisc. — The lowest and earliest ripened of the blueberries. Var. ANGUSTIFÒLIUM (Ait.) Gray. A dwarfer high-mountain or northern form, with narrower lanceolate leaves, 7–20 mm. long, 3–7 mm. broad. — Ct. (*Graves*); mts. of N. Y. and N. E. to Nfd., and far northw.

Var. **nigrum** Wood. (LOW BLACK B.) *Leaves* firmer, *blue-green*, glaucous

beneath; *berries black*, usually without bloom. (*V. nigrum* Britton.) — Often associated with the species, or by itself, N. B. to N. J., Pa., and Mich.

8. V. canadénse Kalm. (Sour-top or Velvet-leaf B.) Low (2–6 dm. high); *leaves oblong-lanceolate or elliptical, entire, downy both sides*, as well as the crowded branchlets, in maturity 2–4 cm. long, 5–15 mm. broad; corolla shorter (4–6 mm. long); berries blue with much bloom (rarely black), ripening later than those of no. 7. — Dry plains, swamps or moist woods, Lab. to Man., s. to N. E., Ill., Minn., and along the mts. to Va. Forma chiocóccum Deane is a rare form with white fruit.

9. V. vacíllans Kalm. (Late Low B.) *Low* (3–9 dm. high), *glabrous*, with yellowish-green branchlets; *leaves obovate or oval*, in maturity 2.5–4.5 cm. long, 1.5–2.5 cm. broad, *very pale or dull, glaucous*, at least underneath, entire or minutely ciliolate-serrulate; calyx usually reddish; corolla 5–8 mm. long, greenish-yellow, often tinged with red; berries blue, with a bloom, ripening later than those of no. 7. — Dry places, especially in sandy soil, N. E. to Mich., and southw.

++ ++ *Shrubs* 1–4 *m. high.*

10. V. corymbòsum L. (High or Swamp B.) Tall (1–4 m.); *leaves ovate to elliptic-lanceolate, smooth* or slightly pubescent beneath, *half-grown at flowering time*, in maturity 4–8 cm. long, 2–4 cm. broad, the margins entire; calyx usually glaucous, the lobes acutish or blunt; *corolla white or pinkish*, 6–10 *mm. long*, varying from ovoid to cylindric-urn-shaped; *berries blue-black, with a bloom*, 7–10 mm. in diameter. — Swamps, low woods, or even dry pastures, Me. to Minn., and southw.; chiefly eastw.

Var. amoènum (Ait.) Gray. Similar; leaves bright green both sides, ciliate-serrulate or bristly-ciliate. — Similar range, less abundant.

Var. pállidum (Ait.) Gray. Glaucous; leaves ciliate-serrulate, whitened beneath. (*V. pallidum* Ait.) — Throughout the range.

11. V. atrocóccum (Gray) Heller. (Black High B.) Resembling the preceding; *leaves* entire, *downy or woolly underneath* even when old, *unexpanded at flowering time;* calyx not glaucous, the lobes obtuse or rounded; *corolla* turgid-ovoid to ellipsoid, *yellowish- or greenish-white, tinged with red*, 5–8 *mm. long; berries polished black, without bloom*, 5–8 mm. in diameter. (*V. corymbosum*, var. Gray.) — Swamps, low woods and barrens, s. Me. to N. C. and Ont. — Flowering and fruiting a week or ten days earlier than no. 10, with which it is often associated.

§ 3. EUVACCÍNIUM Gray. (Bilberries.) *Corolla ellipsoid to globular, 4–5-toothed; filaments glabrous; anthers 2-awned on the back, included; berry 4–5-celled; leaves deciduous; flowers on drooping pedicels, solitary or few together, appearing with or after the leaves; mostly glabrous.*

* *Parts of the flower mostly in fours; stamens* 8.

12. V. uliginòsum L. (Bog Bilberry.) Low and spreading stout shrub 2–60 cm. high; leaves entire, dull, obovate or oblong, in maturity 5–20 mm. long, 3–15 mm. wide, pale and slightly pubescent underneath; flowers single or 2–3 together from a scaly bud, almost sessile; corolla short, urn-shaped; berries black, with a bloom, sweet. — Arctic Am., s. to the barrens of Washington Co., Me., mts. of n. N. E. and n. N. Y., and n. Mich.

* * *Parts of the flower in fives; stamens* 10; *leaves membranaceous; flowers solitary on short axillary peduncles, nodding.*

13. V. caespitòsum Michx. (Dwarf Bilberry.) Dwarf tufted slender shrub (5–30 cm. high), with *rounded branches;* leaves obovate, cuneate-lanceolate or cuneate-spatulate, narrowed at base, smooth and shining, serrate, in maturity 1–4 cm. long, 4–20 mm. broad; *corolla ellipsoid, slightly urn-shaped*, usually pink or coral-red; berries blue, sweet. — Gravelly or rocky woods and shores, Lab. to Alaska, s. to s. Me., s. Vt., n. Mich., n. Wisc., Col., and Cal.; alpine summits, N. E. and N. Y.

14. V. membranàceum Dougl. More erect, 3–15 dm. high; *branchlets somewhat angled: leaves mostly ovate and acute or pointed*, in maturity 2–7 cm. long,

1.5–3 cm. broad, sharply and closely *serrulate*, *bright green*, nearly smooth; border of the calyx almost entire; *corolla depressed-globular*, rather large; berries large, black, rather acid. (*V. myrtilloides* Man. ed. 6, not Michx.) — Damp woods, L. Superior, and northwestw. — Pedicels 5–15 mm. long, drooping in flower, erect in fruit.

15. V. ovalifòlium Sm. Similar, straggling, 5–15 dm. high; *leaves elliptical*, *obtuse*, *nearly entire*, *pale*, mostly glaucous beneath, smooth; *corolla ovoid*; berries blue. — Low woods and mountain slopes, Lab. to Alaska, s. to Nfd., e. Que., n. Mich., and Ore.

§ 4. VÌTIS-IDAÈA [Tourn.] Koch. *Corolla*, *berry*, *etc.*, *as in* § 3; *filaments hairy; anthers awnless; leaves coriaceous and persistent; flowers in clusters from separate buds, 4-merous (in our species); mostly glabrous.*

16. V. Vìtis-Idaèa L. (Cowberry, Foxberry.) Low (1–2.5 dm. high); branches erect from tufted creeping stems; *leaves* obovate with revolute margins, dark green, smooth and shining above, *dotted with blackish bristly points underneath*, 1.5–3 cm. long, 7–16 mm. broad; corolla bell-shaped, 4-cleft, white or pink; berries dark red, acid and rather bitter, edible when cooked. (*Vitis-Idaea* Britton.) — Eu. Represented with us by

Var. mìnus Lodd. (Mountain or Rock Cranberry.) Dwarf, forming close or loose mats 2–10 (rarely even 20) cm. high; leaves very thick and coriaceous, 5–18 mm. long, 4–9 mm. broad; corolla rose-pink or red. — Dry or rocky banks, rarely wet moss, Arctic Am., s. to the mts. of Me., N. H., and Vt., L. Superior, etc.; and along the coast to Cape Ann, Mass. (Greenl., e. Asia.)

§ 5. OXYCÓCCOS [Tourn.] Hook. *Corolla deeply 4-parted or -cleft, with linear reflexed lobes; anthers exserted, awnless, with very long terminal tubes; berry 4-celled; flowers axillary or terminal, nodding on long filiform pedicels.*

* *Stem upright and leaves deciduous, as in common Blueberries; flowers axillary and solitary; corolla deeply 4-cleft; berries light red, turning purple, insipid.*

17. V. erythrocárpum Michx. Smooth, divergently branched, 3–18 dm. high; leaves oblong-lanceolate, taper-pointed, bristly-serrate, thin. (*Oxycoccus* Pers.) — Damp woods, higher Alleghenies, Va. to Ga. July.

** *Stems very slender, creeping or trailing; leaves small, entire, whitened beneath, evergreen; pedicels erect, the pale rose-colored flower nodding; corolla 4-parted; berries red, acid.* — Cranberries.

18. V. Oxycóccos L. (Small Cranberry.) Stems very slender, the branches almost capillary, erect or ascending; *leaves* oblong or ovate, 3–8 *mm. long*, 1–3 *mm. broad*, *strongly revolute*, *becoming narrowly triangular in outline*, *conspicuously whitened beneath; pedicels* 1–4, *springing from a terminal* (rarely proliferating) *short rhachis* (at most 3 or 4 mm. long), *and bearing near or below the middle* 2 lanceolate or lance-ovate often involute *colored bractlets* (1–2.5 *mm. long*); corolla-segments 5–6 mm. long; *filaments* ½ *as long as the anthers; berry* 6–8 *mm. in diameter.* (*Oxyeoccus* MacM.; *O. palustris* Pers.) — In sphagnum and wet humus, Arctic Am., s. to Pa., Mich., and Wisc. (Eurasia.)

Var. intermèdium Gray. *Coarser; leaves* 6.5–15 *mm. long*, 3–6.5 *mm. broad*, acute or obtuse, *only slightly revolute; pedicels* 2–10, *from a longer* (often 5–10 mm. long) *rhachis;* corolla-segments 6–8 mm. long; berry 8–10 mm. in diameter. — Nfd. to B. C., s. to Mich., and in the mts. to N. C. (Asia.)

19. V. macrocárpon Ait. (Large or American Cranberry.) Stems comparatively stout, elongated, the flowering branches ascending; *leaves oblong-elliptic*, blunt or rounded at tip, 6–17 mm. long, 2–8 mm. broad, pale or slightly whitened beneath, flat or slightly revolute; *pedicels* 1–10, *springing from an elongated* (1–3 cm. long) *rhachis* which is *terminated by a long leafy shoot*, and bearing toward the tip 2 *flat leaf-like bractlets* (4–10 mm. long); corolla-segments 6–10 mm. long; filaments scarcely ⅓ the length of the anthers; berry 1–2 cm. in diameter. (*Oxycoccus* Pers.) — Open bogs, swamps, and wet shores, Nfd. to L. Erie, w. Wisc., and southw. to W. Va. and Ark., mostly northeastw.

DIAPENSIACEAE (Diapensia Family)

Low perennial herbs or suffruticulose tufted plants, glabrous or nearly so, with simple leaves, no stipules, regular 5-merous flowers (except the 3-celled ovary), stamens adnate to the corolla and sometimes monadelphous (those opposite its lobes when present reduced to staminodia); pollen simple; loculicidal capsule and seeds of Ericaceae. Flowers solitary or racemose. Style 1, with 3-lobed stigma. — Distinguished from the *Ericaceae* chiefly by the insertion of the stamens upon the corolla.

Tribe I. DIAPENSÌEAE. Dwarf woody evergreens, with small entire crowded coriaceous leaves. Staminodia none; filaments adnate to the campanulate corolla up to the sinuses; anthers 2-celled. Calyx conspicuously bracteolate. Flowers solitary.

1. **Diapensia.** Flower (or at least fruit) on a scape-like peduncle. Anther-cells blunt, obliquely dehiscent. Sepals concave, coriaceous.
2. **Pyxidanthera.** Flowers sessile on short leafy branchlets. Anther-cells awn-pointed at base, opening transversely. Sepals thin.

Tribe II. GALACÍNEAE. Acaulescent, with creeping rootstocks sending up long-petioled evergreen leaves, and a 1-several-flowered scape. Staminodia present.

3. **Galax.** Calyx minutely 2-bracteolate. Stamens monadelphous; anthers 1-celled.

1. DIAPÉNSIA L.

Corolla bell-shaped, 5-lobed; lobes rounded. Filaments broad and flat, adherent to the corolla up to the sinuses, short; anthers adnate, of 2 ovoid cells, diverging below. Capsule, inclosed in the calyx, cartilaginous; cells few-seeded. — Alpine, growing in very dense convex tufts, the stems covered below by imbricated cartilaginous narrowly spatulate mostly opposite leaves, and terminated by a 1-flowered peduncle, 3-bracted under the calyx. Corolla white, 1.5–2 cm. wide. (Said to be an ancient Greek name of the Sanicle, of obscure meaning, strangely applied by Linnaeus to this plant.)

1. **D. lappónica** L. Leaves 5–15 mm. long; peduncle at length 1.5–3 cm. long. — Alpine summits, N. E., N. Y., and northw. June, July. (Eurasia.)

2. PYXIDANTHÈRA Michx.

Prostrate and creeping, with narrowly oblanceolate and awl-pointed leaves, mostly alternate on the sterile branches and somewhat hairy near the base. Flowers solitary and sessile, very numerous, white or rose-color. (Name from πυξίς, *a small box*, and *anthera*, new Latin for anther, the anther opening as if by a lid.)

1. **P. barbulàta** Michx. (Flowering Moss, Pyxie.) Leaves 3–8 mm. long. — Sandy pine barrens of N. J. to N. C. Apr., May.

3. GÀLAX L.

Calyx imbricate, persistent. Petals hypogynous, obovate-spatulate, rather erect, deciduous. Filaments united into a 10-toothed tube, slightly adhering to the base of the petals, the 5 teeth opposite the petals naked, the alternate ones shorter and bearing roundish anthers, which open across the top. Style short. Capsule ovoid, 3-celled; columella none. Seeds numerous, the cellular loose coat tapering to each end. — Evergreen herb, with a thick matted tuft of scaly creeping rootstocks, beset with fibrous red roots, sending up round-heart-shaped crenate-toothed and veiny shining leaves (3–16 cm. wide), and a slender naked scape, 3–8 dm. high, bearing a wand-like spike or raceme of small and minutely bracted white flowers. (Name from γάλα, *milk*, — of no conceivable application to this plant.)

1. **G. aphýlla** L. — Open woods, Va. to Ga. June.

PLUMBAGINÀCEAE (Leadwort Family)

Herbs, with regular 5-merous flowers, a plaited calyx, the 5 stamens opposite the separate petals or the lobes of the corolla, and the free ovary 1-celled, with a solitary ovule hanging from a long cord which rises from the base of the cell. — Represented in our flora by the single genus

1. LIMÒNIUM [Tourn.] Hill. Sea Lavender. Marsh Rosemary

Flowers scattered or loosely spiked and 1-sided on the branches, 2–3-bracted. Calyx funnel-form, dry and membranaceous, persistent. Corolla of 5 nearly or quite distinct petals, with long claws, the 5 stamens severally attached to their bases. Styles 5, rarely 3, separate. Fruit membranous and indehiscent, in the bottom of the calyx. Embryo straight, in mealy albumen. — Sea-side perennials, with thick and stalked radical leaves; the naked flowering stems or scapes branched into panicles. (Λειμώνιον, the ancient Greek name, presumably from λειμών, *a meadow.*) Statice Willd., not L.

1. **L. carolinianum** (Walt.) Britton. Root thick and woody, very astringent; leaves oblong, spatulate, or obovate-lanceolate, 1-ribbed, tipped with a deciduous bristly point, petioled; scape much-branched, panicled, 1.5–6 dm. high; spikelets 1–3-flowered; flowers lavender-color; calyx-tube hairy on the angles, the lobes acute or acuminate, with as many teeth in the sinuses. (*Statice Limonium*, var. Gray.) — Salt marshes, Lab. to Tex. July–Sept.

PRIMULÀCEAE (Primrose Family)

Herbs, with simple leaves, and regular perfect flowers, the stamens as many as the lobes of the gamopetalous (rarely polypetalous) corolla (none in Glaux*) and inserted opposite them* (on the tube or base), *and a 1-celled ovary with a central free placenta rising from the base, bearing several or many seeds.* Calyx free from the ovary, or in *Samolus* partly adherent. Stamens 4 or 5, rarely 6 or 8. Style and stigma one. Seeds with a small embryo in fleshy albumen. Ovules amphitropous, except in *Hottonia.*

* Corolla or petaloid calyx with erect or spreading segments.

+ Stemless; leaves all in a cluster from the root; capsule dehiscent by valves or teeth.

1. **Primula.** Corolla funnel-form or salver-shaped, open at the throat. Stamens included.
2. **Androsace.** Corolla short, very small, constricted at the throat. Stamens included.

+ + Stems leafy.

++ Aquatic; immersed leaves pectinate.

3. **Hottonia.** Corolla short-salver-form. Flowers verticillate and racemose.

++ ++ Terrestrial or marsh plants; leaves entire.

= Ovary adnate at base to the base of the calyx.

4. **Samolus.** Corolla bell-shaped, with 5 staminodia in the sinuses. Flowers racemose.

= = Ovary wholly free.

a. Capsule dehiscent vertically by valves or irregularly, mostly globose.

5. **Lysimachia.** Corolla 5–6-parted or 5–6-petaled. Staminodia none. Leaves dotted.
6. **Steironema.** Corolla and calyx 5-parted. Five slender staminodia between the fertile stamens.
7. **Trientalis.** Corolla and calyx mostly 7-parted. Stem leafy only at the summit.
8. **Glaux.** Corolla none; the calyx petal-like. Flowers axillary.

b. Globose capsule circumscissile, the top falling off as a lid; flowers axillary.

9. **Anagallis.** Corolla longer than the calyx, 5-parted. Leaves opposite.
10. **Centunculus.** Corolla shorter than the calyx, 4–5-cleft. Leaves alternate.

* * Corolla and calyx with reflexed segments.

11. **Dodecatheon.** Corolla 5-parted. Stamens exserted, connivent in a cone.

1. PRÍMULA L. Primrose. Cowslip

Calyx tubular, angled, 5-cleft. Corolla enlarging above the insertion of the stamens; the 5 lobes often notched or inversely heart-shaped. Capsule many-seeded, splitting at the top into 5 valves or 10 teeth. — Low perennial herbs, with tufted and simple scapes, the flowers in an umbel. (Name a diminutive of *primus*, from the flowering of the true primrose in early spring.)

1. P. farinòsa L. (Bird's-eye P.) Scape 0.5–3 dm. high; leaves oblanceolate to narrowly obovate, denticulate, 1.5–6 cm. long, *the lower side* and the 1–20-flowered *involucre, etc., covered with a white mealiness*, at least when young; *involucral bracts* lance-attenuate, 3.5–6 *mm. long;* pedicels in anthesis mostly shorter than the calyx, in fruit becoming slightly longer; *calyx* 3–5 *mm. long; corolla* pale lilac, with a yellow eye, its *tube barely exserted;* capsule 6–8 mm. long, slightly exserted. — Nfd. and Lab. to n. Mich. (Eurasia.) Var. americàna Torr. Similar; *leaves narrow, stiff*, 2–6 cm. long, *sulphur-yellow beneath; pedicels elongate*, often 2–5 times as long as the calyx; capsule much exserted. — Shores of L. Huron and L. Michigan.

Var. macrópoda Fernald. Scape 1–4.5 dm. high; *leaves* spatulate to rhombic-ovate, *long-petioled*, 2.5–10 cm. long, *usually whitened beneath; bracts* involute in drying, 6–11 *mm. long; pedicels usually elongate*, 1–5 cm. long; *calyx in anthesis* 6–8 *mm. long; capsule* 9–12 *mm. long*, exserted. — Calcareous cliffs and shores, Lab. to Mackenzie, s. to N. S., Me., and Sask.

2. P. mistassínica Michx. Scape 0.5–2 dm. high; *leaves* spatulate or wedge-oblong, *thin and veiny, scarcely or not at all mealy*, 1–4 *cm. long;* involucre 1–8-flowered, the lance-subulate *bracts* 2–4 *mm. long;* pedicels filiform, in anthesis mostly exceeding the calyx, loosely ascending, in fruit much elongate; calyx 3–5 mm. long; *corolla* flesh-color (rarely white), its *tube conspicuously exserted;* capsule 5–8 mm. long. — Wet calcareous banks and shores, Nfd. to Sask., s. to N. B., Me., Vt., N. Y., Mich., Wisc., and Minn. May–July.

2. ANDRÓSACE [Tourn.] L.

Calyx 5-cleft; tube short. Corolla salver-shaped or funnel-form; the tube shorter than the calyx; limb 5-parted. Capsule 5-valved. — Small herbs, with clustered root-leaves, and very small solitary or umbeled flowers. (An ancient Greek name of a polyp, formerly believed to be a plant.)

1. A. occidentàlis Pursh. Smoothish annual; scapes diffuse, 2–8 cm. high, several-flowered; leaves and bracts of the involucre oblong-ovate, entire, sessile; calyx-lobes leafy, triangular-lanceolate, longer than the white corolla. — Bare hills and barrens, Ill. to Man., and westw. Apr., May.

3. HOTTÒNIA [Boerh.] L. Featherfoil. Water Violet

Calyx 5-parted, the divisions linear. Corolla with a short tube; limb 5-parted. Stamens 5, included. Capsule many-seeded, 5-valved; the valves cohering at the base and summit. Seeds anatropous. — Perennials, with the erect hollow flower-stems almost leafless. Flowers white or whitish, whorled at the joints, forming an interrupted raceme. (Named for *Peter Hotton*, early Dutch botanist.)

1. H. inflàta Ell. Leaves dissected into thread-like divisions, scattered on the floating and rooting stems, and crowded at the base of the cluster of peduncles, which are strongly inflated between the joints; pedicels short. — Pools and ditches, s. Me. to Fla. and La., near the coast; inland in the Miss. basin to Mo. and Ind. May–Aug.

4. SÁMOLUS [Tourn.] L. Water Pimpernel. Brook-weed

Calyx 5-cleft. Corolla somewhat bell-shaped, 5-cleft. True stamens 5, on the corolla-tube, included. Capsule globose, 5-valved at the summit, many-seeded. — Smooth herbs, with alternate entire leaves, and small white flowers.

(Ancient name of Celtic origin, said to refer to curative properties of this genus in diseases of cattle and swine.)

1. S. Valerándi L. Stem erect, 0.5–8 dm. high, leafy; leaves obovate or spatulate, the basal rosulate; bracts none; slender *pedicels ascending*, bracteolate in the middle, *in maturity* 6–11 *mm. long; capsule* 3–4 *mm. long.* — Ballast, Philadelphia, etc. (Adv. from Eu.)

2. S. floribúndus H B K. More slender, becoming diffuse; racemes often panicled, the *pedicels longer* (11–18 *mm. long*) *and spreading; capsule* 2–3 *mm. long.* (*S. Valerandi*, var. *americanus* Gray.) — Wet places, chiefly near the coast, and at low altitudes inland. June–Sept.

5. LYSIMÀCHIA [Tourn.] L. Loosestrife

Calyx 5–6-parted. Corolla rotate, the divisions entire, convolute in bud. Filaments commonly monadelphous at base; anthers oblong or oval. Capsule few–several-seeded. — Leafy-stemmed perennials, with herbage commonly glandular-dotted. (In honor of King *Lysimachus*, or from λύσις, *a release from*, and μάχη, *strife.*)

§ 1. LYSIMÁSTRUM Duby. *Corolla yellow, rotate, very deeply parted, and with no teeth between the lobes; stamens more or less monadelphous, often unequal; leaves opposite or whorled, or some abnormally alternate.*

* *Corolla plain yellow, without dark markings.*

1. L. vulgàris L. Coarse and tall, softly often viscidly pubescent, branching above; leaves lanceolate to ovate-lanceolate, distinctly short-petioled; *flowers* 1.5–2 cm. broad, *in terminal leafy panicles; calyx* 4–5 *mm. long, with dark margin;* glandular filaments united to near the middle. — Roadsides and thickets near towns, Me. to Ont. and O. July–Sept. (Nat. from Eu.)

2. L. punctàta L. Similar, but with *flowers often merely whorled in the upper axils; calyx* 7–10 *mm. long, green throughout;* corolla-lobes with glandular-ciliolate margins. — Roadsides, etc., N. S. to N. J. and Pa. June–July. (Nat. from Eu.)

** *Corolla dark-dotted or streaked; filaments conspicuously monadelphous, unequal.*

3. L. quadrifòlia L. Somewhat loosely hairy, or smooth; stem simple, 3–9 dm. high; *leaves whorled* in fours or fives (sometimes in twos, threes, or sixes, rarely only opposite or partly alternate), lanceolate to lance-ovate; *flowers* on long capillary peduncles *from the axils of the leaves;* corolla 1–1.5 cm. broad, its lobes ovate-oblong. — Moist or sandy soil, N. B. to Ont., Minn., Mich., and Ga. June, July.

× L. prodúcta (Gray) Fernald. Stem smooth, 0.5–1 m. high, simple or slightly branched; leaves opposite or in whorls of 3–5, lanceolate to ovate-lanceolate; *flowers in terminal bracted racemes* (0.5–5 dm. long), *the lower from the axils of the upper foliage leaves;* corolla 1–2 cm. broad, the lobes ovate-oblong to oblong-lanceolate. (*L. foliosa* Small.) — Damp thickets and shores, Me. to N. C. and Mich. July, Aug. — Apparently a widely distributed and fertile hybrid of nos. 3 and 4.

4. L. terréstris (L.) B S P. Stems 2–8 dm. high, often bearing oblong or moniliform bulblets in the axils, smooth, at length branched, very leafy; *leaves opposite* or rarely alternate, lanceolate, acute at each end; *flowers* on slender pedicels, *in a bracted raceme* (0.5–2.5 dm. long); lobes of the corolla lance-oblong. (*L. stricta* Ait.) — Low grounds, Nfd. to Hudson Bay, and southw. June–Aug.

*** *Flowers 2–3 cm. broad, solitary in the axils of ordinary leaves; corolla not dark-dotted nor streaked; filaments slightly monadelphous.*

5. L. Nummulària L. (Moneywort.) Smooth; stems trailing and creeping; leaves roundish, small, short-petioled; divisions of the corolla broadly ovate, obtuse, longer than the lance-ovate calyx-lobes and stamens. — Escaped from gardens into damp ground in some places. June–Aug. (Introd. from Eu.)

§ 2. NAUMBÚRGIA (Moench) Koch. *Corolla very deeply* 5(*or* 6–7)-*parted into linear somewhat purplish-dotted divisions, with or without a small tooth in each sinus; filaments distinct, equal; leaves opposite* (rarely whorled), *the lowest scale-like.*

6. L. thyrsiflòra L. (TUFTED L.) Smooth (or with loose scurfy pubescence above when young); stem simple, 2.5–8 dm. high; all but the lower leaves lanceolate, the axils of 1–4 middle pairs bearing short-peduncled head-like or spike-like clusters of small light yellow flowers. — Cold swamps, Que. to Sask., s. to Pa., Ill., Mo., etc. May–July. (Eu.)

6. STEIRONÈMA Raf.

Corolla rotate, with no proper tube; divisions ovate, cuspidate-pointed, erose-denticulate above, each separately involute around its stamen. Filaments distinct or nearly so on the ring at base of corolla; anthers linear. Capsule 10–20-seeded. — Leafy-stemmed perennials, glabrous except the ciliate petioles, not punctate, the leaves all opposite, but mostly in seeming whorls on the flowering branches. Peduncles slender, axillary, bearing yellow flowers. (From στεῖρος, *sterile*, and νῆμα, *thread*, referring to the staminodia.)

1. S. ciliàtum (L.) Raf. *Stem erect*, 3–12 dm. high; *leaves ovate-lanceolate to broadly ovate*, 5–13 *cm. long*, tapering to an acute point, *rounded or heart-shaped at base*, all on *long ciliate-fringed petioles; corolla longer than the calyx; fruiting calyx* 6–10 *mm. long*, commonly exceeded by the capsule. — Low grounds and thickets. June–Aug.

2. S. intermèdium Kearney. Comparatively low, 2–7 dm. high; *leaves* 3–8 *cm. long*, the *petioles naked except at base;* calyx-lobes commonly exceeding the capsule. (*S. tonsum* Bicknell.) — Usually in drier rocky soil, Va., Ky., and southw.

3. S. radìcans (Hook.) Gray. *Stem slender, soon reclined*, the elongated branches often rooting in the mud; *leaves lanceolate to ovate-lanceolate, mostly rounded at base*, 2.5–9 cm. long, *on slender petioles; corolla about the length of the calyx; fruiting calyx* 3–5 *mm. long.* — Swampy river-banks, Va. to Mo. and Tex. June–Aug.

4. S. lanceolàtum (Walt.) Gray. *Stem erect* (or rarely reclined and rooting at the joints); *leaves lanceolate*, 4–10 cm. long, *narrowed into a short margined petiole* or tapering base, or the lowest short and broad on long petioles; corolla longer than the calyx; *fruiting calyx* 5–8 *mm. long.* — Low grounds and thickets, Me. to N. Dak., and southw. Var. HYBRIDUM (Michx.) Gray, with cauline leaves oblong, is less frequent.

5. S. quadriflòrum (Sims) Hitchc. *Stem erect*, 4-angled, slender, 2–9 dm. high, often branched below; *stem-leaves sessile, narrowly linear, elongated*, 3–9 cm. long, smooth and shining, rather rigid, obtuse, the margins often a little revolute, the veins obscure; the lowest leaves oblong or spatulate; corolla longer than the calyx, the lobes conspicuously pointed; fruiting calyx 5–7 mm. long. (*S. longifolium* Gray.) — Banks of streams, N. Y. to Man., s. to Va. and Mo. June–Sept.

7. TRIENTÀLIS L. CHICKWEED WINTERGREEN

Corolla spreading, flat, without tube. Filaments slender, united in a ring at the base; anthers oblong, revolute after flowering. Capsule few-seeded. — Low and smooth perennials, with simple erect stems, bearing a few alternate usually minute and scale-like leaves below, and a whorl of thin veiny leaves at the summit. Peduncles one or more, very slender, bearing a delicate white and star-shaped flower. (A Latin name, meaning the third part of a foot, alluding to the height of the plant.)

1. T. americàna (Pers.) Pursh. (STAR FLOWER.) Spreading by very slender elongated rootstocks, rarely producing long stolons from the upper axils, leaves elongated-lanceolate, tapering to both ends; petals finely pointed. — Woods, Lab. to Man., Minn., Ill., and Va. May–July.

8. GLAÚX [Tourn.] L. Sea Milkwort

Calyx bell-shaped, 5-cleft; lobes ovate or oblong, petal-like. Corolla wanting. Stamens 5, on the base of the calyx, alternate with its lobes. Capsule 5-valved, few-seeded. — A low and leafy fleshy perennial, with opposite entire sessile leaves, and solitary nearly sessile (white, pink, or lavender and crimson) flowers in their axils. (An ancient Greek name, from γλαυκός, *sea-green.*)

1. **G. marítima** L. Diffusely branched (rarely simple), the branches prostrate, loosely ascending or sometimes erect, 3–15 cm. high; *leaves linear to oblong*, the larger 3–12 mm. long, 1.5–6 mm. broad, *bluntly pointed;* flowers 3–5 mm. long; mature capsule 2–3 mm. long, 2–2.5 mm. broad. — Seashores from Cape Cod northw.; also in subsaline soil, Minn. to Sask., and westw. June, July. (Eurasia.) Passing to the commoner

Var. **obtusifòlia** Fernald. *Erect*, 0.5–3 dm. high, simple or with few erect branches; *leaves oval or broadly oblong*, the principal ones 8–15 mm. long, 4–8 mm. broad, *with rounded tips; mature capsule* 2.5–4 *mm. broad.* — N. J., northw.; also Pacific coast. (Japan, etc.)

9. ANAGÁLLIS [Tourn.] L. Pimpernel

Corolla wheel-shaped, with almost no tube; the divisions broad. Stamens 5; filaments bearded. Capsule membranaceous, many-seeded. — Low spreading or procumbent herbs, mostly annuals, with opposite or whorled entire leaves, and solitary flowers on axillary peduncles. (The ancient Greek name, probably from ἀνά, *again*, and ἀγάλλειν, *to delight in.*)

1. **A. arvénsis** L. (Common P.) Leaves ovate, sessile, shorter than the peduncles; petals obovate, obtuse, fringed with minute teeth and stalked glands. — Waste sandy fields. June–Aug. — Flowers variable in size, scarlet or white, quickly closing at the approach of bad weather; whence the English popular name of "*Poor Man's Weatherglass.*" (Nat. from Eu.) Var. caerùlea (Schreb.) Ledeb. Petals blue, often nearly or quite destitute of glandular ciliation. — Cultivated ground, etc., rather rare. (Adv. from Eurasia.)

10. CENTÚNCULUS [Dill.] L. Chaffweed

Corolla wheel-shaped, with an urn-shaped short tube, usually withering on the summit of the pod (which is like that of *Anagallis*). Stamens 4 or 5; filaments beardless. — Small annuals, with entire leaves, and solitary inconspicuous flowers in their axils. (Derivation obscure.)

1. **C. mínimus** L. Stems ascending, 3–8 cm. long; leaves ovate, obovate, or spatulate-oblong; flowers nearly sessile, the parts mostly in fours. — Low grounds, P. E. I. (according to Macoun); and from Ill. and Minn. to Fla., Tex., and westw. (Eu.)

11. DODECÀTHEON L. American Cowslip

Calyx deeply 5-cleft, the divisions lanceolate. Corolla with a very short tube and thickened throat; the divisions long and narrow. Filaments short, monadelphous at base; anthers long and linear, approximate in a slender cone. — Perennial smooth herb, with fibrous roots, a cluster of basal leaves, and a simple naked scape, involucrate with small bracts at the summit, bearing an ample umbel of showy flowers, nodding on slender pedicels. Corolla rose-color, or sometimes white. (Name from δώδεκα, *twelve*, and θεοί, *gods*, given by Pliny to the primrose, which was believed to be under the care of the superior gods.)

1. **D. Meàdia** L. (Shooting Star.) Leaves oblong or spatulate, gradually narrowed at base. — Woods, prairies, and moist cliffs, Pa. and Md. to Man., and southw. May, June.

Var. **Frénchii** Vasey. Leaves ovate or elliptic, abruptly narrowed at base. — Pa. to Ill. and Ark.

SAPOTÀCEAE (Sapodilla Family)

Trees or shrubs, mostly with a milky juice, simple and entire alternate leaves (often rusty-downy beneath), small and perfect regular flowers usually in axillary clusters; the calyx free and persistent; the fertile stamens commonly as many as the lobes of the hypogynous short corolla and opposite them, inserted on its tube, along with one or more rows of appendages and scales (or sterile stamens); anthers turned outward; ovary 4–12-celled, with a single anatropous ovule in each cell; seeds large. Albumen mostly none; but the large embryo with thickened cotyledons. Style single, pointed. — A small mostly tropical family.

1. BUMÈLIA Sw.

Calyx 5-parted. Corolla 5-cleft, with a pair of internal appendages at each sinus. Fertile stamens 5; anthers arrow-shaped. Sterile stamens 5, petal-like, alternate with the lobes of the corolla. Ovary 5-celled. Fruit small, resembling a cherry, black, containing a large ovoid and erect seed, with a roundish scar at its base. — Flowers small, white, in fascicles from the axils of the leaves. Branches sometimes spiny. Leaves often fascicled on short spurs. Wood very hard. (The ancient name of a kind of Ash.)

1. **B. lycioides** (L.) Pers. (Southern Buckthorn.) Spiny, 3–9 dm. high; *leaves wedge-oblong varying to oval-lanceolate*, with a tapering base, often acute, *reticulated, nearly glabrous*, 3–12 cm. long; *clusters densely many-flowered*, glabrous; fruit ovoid. — Moist ground, Va. to s. Ill., Fla., and Tex. June, July.

2. **B. lanuginòsa** (Michx.) Pers. (False Buckthorn.) Spiny, 3–18 m. high; *leaves oblong-obovate or wedge-obovate, rusty-woolly beneath*, obtuse, 2.5–9 cm. long; *clusters 6–12-flowered*, pubescent; fruit globular. — Woods, s. Ill. to Kan., southw. to Fla. and Tex. July.

EBENÀCEAE (Ebony Family)

Trees or shrubs, with alternate entire leaves, and polygamous regular flowers which have a calyx free from the 3–12-celled ovary; the stamens 2–4 times as many as the lobes of the corolla, often in pairs before them, their anthers turned inward, and the fruit a several-celled berry; ovules 1 or 2, suspended from the summit of each cell. Seeds anatropous, mostly single in each cell, large and flat, with a smooth coriaceous integument; the embryo shorter than the hard albumen, with a long radicle and flat cotyledons. Styles wholly or partly separate. Wood hard and dark-colored. No milky juice. — A small family, chiefly tropical.

1. DIOSPŶROS L. Persimmon

Calyx 4–6-lobed. Corolla 4–6-lobed, convolute in the bud. Stamens commonly 16 in the sterile flowers, and 8 in the fertile, in the latter imperfect. Berry large, globular, surrounded at base by the thickish calyx, 4–8-celled, 4–8-seeded. — Flowers dioeciously polygamous, the fertile axillary and solitary, the sterile smaller and often clustered. (Name from Διός, *of Jove*, and πυρός, *grain*.)

1. **D. virginiàna** L. (Common P.) Leaves thickish, ovate-oblong, smooth or nearly so; peduncles very short; calyx 4-parted; corolla pale yellow, thickish, between bell-shaped and urn-shaped, 1–1.5 cm. long in the fertile flowers, much smaller in the sterile; styles 4, two-lobed at the apex; ovary 8-celled. — Woods and old fields, Ct. to s. e. Ia., and southw. June. — Tree, 6–30 m. high, with very hard blackish wood; the plum-like fruit 2–4 cm. in diameter, exceedingly astringent when green, yellow when ripe, and sweet and sometimes edible after exposure to frost.

STYRACACEAE (Storax Family)

Shrubs or trees, with alternate simple leaves destitute of stipules, and perfect regular flowers; the calyx either free or adherent to the 2–5-celled ovary; the corolla of 4–8 petals, commonly more or less united at base; the stamens twice as many as the petals or more numerous, monadelphous or polyadelphous at base, style 1; fruit dry or drupe-like, 1–5-celled, the cells commonly 1-seeded. Seeds anatropous. Embryo nearly the length of the albumen; radicle slender, as long as or longer than the flat cotyledons. Corolla hypogynous when the calyx is free; the stamens adherent to its base. Ovules 2 or more in each cell. — A small family, mostly of warm countries.

* Calyx 5-cleft, imbricate; stamens in several series; anthers short, innate; embryo terete; flowers yellow; pubescence simple.

1. **Symplocos.** Calyx adherent to the lower part of the 3-celled ovary. Petals 5, united merely at the base.

** Calyx 4–8-toothed or entire; stamens 2–4 times as many as the petals, in one series; anthers linear or oblong, adnate, introrse; cotyledons flat; flowers white; pubescence soft and mostly stellate.

2. **Halesia.** Calyx adherent to the whole surface of the 2–4-celled ovary, which is 2–4-winged and 1–4-celled in fruit. Corolla 4-lobed.
3. **Styrax.** Calyx adherent only to the base of the 3-celled ovary. Corolla mostly 5-parted. Fruit 1-celled, mostly 1-seeded.

1. SÝMPLOCOS Jacq. Sweet Leaf

Petals imbricated in the bud. Stamens in 5 clusters, one adhering to the base of each petal; filaments slender. Fruit drupe-like or dry, mostly 1-celled and 1-seeded. — Shrubs or small trees, the leaves commonly turning yellowish in drying, and furnishing a yellow dye. Flowers in axillary clusters or racemes, yellow. (Name σύμπλοκος, *connected*, from the union of the stamens.)

1. **S. tinctòria** (L.) L'Hér. (Horse Sugar.) Leaves elongated-oblong, acute, obscurely toothed, thickish, almost persistent, minutely pubescent and pale beneath, 7–15 cm. long; flowers 6–14, in close and bracted clusters, odorous. — Rich ground, Del. to Fla. and La. Apr. — Leaves sweet, greedily eaten by cattle.

2. HALÈSIA Ellis. Snowdrop or Silver-bell Tree

Calyx inversely conical, 4-toothed; the tube 4-ribbed. Petals 4, united at base, or oftener to the middle, into an open bell-shaped corolla, convolute or imbricated in the bud. Stamens 8–16; filaments united into a ring at base, and usually a little adherent to the base of the corolla; anthers linear-oblong. Ovules 4 in each cell. Fruit large and dry, bony within. Seeds single, cylindrical. — Shrubs or small trees, with large and veiny pointed deciduous leaves; the snowy white flowers drooping on slender pedicels, in clusters or short racemes, from axillary buds of the preceding year. Pubescence partly stellate. (Named for *Stephen Hales*, author of Vegetable Statics, etc.) Mohrodendron Britton.

1. **H. carolina** L. (Opossum Wood.) Leaves oblong-ovate; fruit 4-winged, 3–4 cm. long. (*H. tetraptera* L.; *Mohrodendron carolinum* Britton.) — Banks of streams, Va. to Ill., s. to Fla. — Flowers opening while still small and green (according to Harper).

3. STŸRAX [Tourn.] L. Storax

Calyx truncate, somewhat 5-toothed. Corolla 5(rarely 4–8)-parted, large; the lobes mostly soft-downy. Stamens twice as many as the lobes of the corolla; filaments flat, united at the base into a short tube; anthers linear. Fruit globular, its base surrounded by the persistent calyx, dry, often 3-valved. Seed globular, erect, with a hard coat. — Shrubs or small trees, with commonly deciduous leaves, and axillary or leafy-racemed white and showy flowers on drooping peduncles, produced in spring. (The ancient Greek name of the tree which produces *storax*.)

1. **S. grandifòlia** Ait. Shrub, 1–3.5 m. high; *leaves* obovate, acute or short-acuminate, *white-tomentose beneath*, 0.5–1.5 dm. long; *flowers mostly in elongated racemes;* corolla 1.5 cm. long, convolute-imbricated in bud. — Woods. s. Va. to Fla.

2. **S. pulverulénta** Michx. Shrub, 0.3–1.2 m. high; *leaves* oval or obovate, 3–6 cm. long, *sparingly puberulent above, and scurfy-tomentose beneath; flowers* 1–1.5 cm. long, 1–3 *together in the axils* and at the tips of the branches, fragrant. — Low pine barrens, s. Va. to Fla. and Tex.

3. **S. americàna** Lam. Shrub, 1–2.5 m. high; *leaves* oblong, acute at both ends, 2.5–9 cm. long, *smooth, or barely pulverulent beneath; flowers axillary or in 3–4-flowered racemes;* corolla valvate in the bud. — Along streams, in cypress swamps, etc., Va. to Fla., La., and northw. in the Miss. Valley to Mo. and Ill.

OLEÀCEAE (Olive Family)

Trees or shrubs, with opposite and pinnate or simple leaves, a 4-cleft (or sometimes obsolete) calyx, a regular 4-cleft or nearly or quite 4-petalous corolla, sometimes apetalous; the stamens only 2 (rarely 3 or 4); the ovary 2-celled, with 2 (rarely more) ovules in each cell. Seeds anatropous, with a large straight embryo in hard fleshy albumen, or without albumen.

Tribe I. FRAXÍNEAE. Fruit dry, indehiscent, winged, a samara. Leaves pinnate.
1. **Fraxinus.** Flowers mostly apetalous, sometimes also without calyx.

Tribe II. SYRÍNGEAE. Fruit a loculicidal capsule. Leaves simple.
2. **Syringa.** Corolla salver-form, the lobes mostly 4, valvate in bud.

Tribe III. OLEÍNEAE. Fruit a drupe, or rarely a berry. Leaves simple.
3. **Adelia.** Flowers apetalous, dioecious or polygamous, from a scaly catkin-like bud. Stamens 2–4.
4. **Chionanthus.** Flowers complete, sometimes polygamous. Calyx and corolla 4-merous, the latter with long and linear divisions.
5. **Ligustrum.** Corolla funnel-form, 4-cleft, the tube longer than the calyx.

1. FRÁXINUS [Tourn.] L. Ash

Flowers dioecious, polygamous, or monoecious. Calyx small and 4-cleft, toothed, or entire, or obsolete. Petals 4, or altogether wanting in our species. Stamens 2, sometimes 3 or 4; anthers linear or oblong, large. Style single; stigma 2-cleft. Fruit 1–2-celled, flattened, 1–2-seeded. Cotyledons elliptical; radicle slender. — Timber-trees, with petioled pinnate leaves; the small flowers in crowded panicles or racemes from the axils of last year's leaves. (The classical Latin name.)

* *Leaflets petiolulate; anthers linear-oblong.*

+ *Calyx small, persistent in fruit.*

++ *Fruit with a terete or nearly terete body.*

1. **F. americàna** L. (White A.) *Branchlets and petioles glabrous;* leaflets 5–9, ovate- or lance-oblong, pointed, pale and either smooth or pubescent under-

neath, entire or sparingly serrate or denticulate; *fruit* 2.5–5 cm. long, *margin-less below, abruptly dilated into a lanceolate, oblanceolate, or wedge-linear wing* 2–3 times as long as the cylindraceous body (1.3–2 cm. long, 3–4 mm. thick). — Rich or moist woods, N. S. to Ont., and southw. Apr., May. — A large and very valuable forest tree, with gray furrowed bark, smooth gray branchlets, and rust-colored buds. Monoecious flowers rarely occur. Fig. 846.

846. F. americana. Fruit × ⅔.

2. F. biltmoreàna Beadle. *Branchlets, petioles*, etc., *pubescent or tomentose;* leaflets 7–9, lanceolate, acuminate, decidedly paler and sparingly pubescent beneath; *fruit linear-oblong*, scarcely narrowed to the rounded apex, *the body short and stout* (1–1.4 cm. long, 4–5 mm. thick). — Pa. to Ga.

3. F. pennsylvánica Marsh. (Red A.) *Branchlets and petioles velvety-pubescent;* leaflets 5–9, ovate or oblong-lanceolate, taper-pointed, almost entire, pale or more or less pubescent beneath; *fruit* 2.5–7 *cm. long, the edges gradually dilated into the linear or spatulate wing*, the body 1.4–2 cm. long, 2–3 mm. thick. (*F. pubescens* Lam., including the narrowest-fruited form, *F. Darlingtonii* Britton.) — Low ground, Me. to Dak., and southw. — Tree of middle or large size; inner face of outer bark of the branches red or cinnamon-color when fresh. Fig. 847. Passing to

847. F. pennsylvanica Fruit × ⅔.

Var. lanceolàta (Borkh.) Sarg. (Green A.) *Glabrous throughout; leaflets* often wedge-shaped at the base and serrate above, *bright green both sides.* (*F. viridis* Michx. f.) — Along streams, Me. to Sask., and southw.

*** *Fruit with a flattish body passing insensibly into the wing.*

4. F. profúnda Bush. (Pumpkin A.) Terete branchlets velvety-pubescent, as are the petioles, rhachises, etc.; leaflets 7–9, ovate-lanceolate, long-petiolulate, subentire; *fruit linear-oblong, rounded or retuse at the apex*, somewhat narrowed to the thickish base but without distinctly limited body. — River-swamps, etc., w. N. Y. to Mo., and southw.

848. F. caroliniana. Fruit × ⅔.

5. F. caroliniàna Mill. (Water A.) Branchlets terete, glabrous or pubescent; leaflets 5–7, ovate or oblong, acute at both ends, short-stalked; *fruit broadly winged* (not rarely 3-winged), *elliptic or oblanceolate, acutish at apex, with a tapering base.* (*F. platycarpa* Michx.) — River-swamps, Va. to Fla., La., and Mo. March. — Tree of middle size. Fig. 848.

** *Calyx wanting or a mere disk-like ring.*

6. F. quadrangulàta Michx. (Blue A.) *Branchlets square* (at least on vigorous shoots), glabrous; leaflets 7–11, short-stalked, oblong-ovate or lanceolate, pointed, sharply serrate, green both sides; *fruit oblong, blunt, and of the same width at both ends*, or slightly narrowed at the base, often notched at the apex, 2.5–5 cm. long, 6–15 mm. wide. — Dry or moist rich woods, O. to Mich. and Minn., Ala., Ark., etc. — Large timber-tree, the inner bark yielding a blue color to water.

** *Lateral leaflets sessile; anthers short-oblong; flowers wholly naked.*

7. F. nigra Marsh. (Black A.) Branchlets and petioles glabrous; leaflets 7–11, oblong-lanceolate, tapering to a point, serrate, obtuse or rounded at the base, green and smooth both sides, when young with some rusty hairs along the midrib; fruit linear-oblong or narrowly elliptical, blunt at both ends. (*F. sambucifolia* Lam.) — Swamps and wet banks, Nfd. to Man., Del., Va., and

Ark. — Small or middle-sized tree, with very tough and fissile wood. Bruised foliage exhales the odor of Elder.

2. SYRÍNGA L. Lilac

Corolla salver-formed, much exceeding the 4-toothed calyx, pale violet to roseate or white. Ovary 2-celled; ovules 2 in each cell, pendulous. — Upright shrubs with simple opposite ovate or lanceolate leaves and numerous flowers in thyrsoid or pyramidal panicles. (Name from σῦριγξ, *a pipe or tube*, perhaps in reference to the tubular corolla, perhaps to the use of the wood for pipe-stems or whistles.)

1. S. vulgàris L. (Common L.) Leaves ovate, acuminate, entire, truncate or subcordate at base, slender-petioled; corolla lilac-purple, rarely white. — Long popular in cultivation and not rarely found in a wild state. (Introd. from Eu.)

3. ADÈLIA P. Br.

Calyx of 4 minute sepals. Anthers oblong. Ovary ovoid, 2-celled, with 2 pendulous ovules in each cell; style slender; stigma somewhat 2-lobed. Drupe small, ovoid, 1-celled, 1-seeded. — Shrubs, with opposite and often fascicled deciduous leaves, and small flowers from the axils of the preceding year. Fertile peduncles short, 1–3-flowered. (Name from ἄδηλος, *obscure*, from the minute flowers.) Forestiera Poir.

1. A. acuminàta Michx. (Swamp Privet.) Glabrous, somewhat spinescent, 1.5–3 m. high; leaves thin, oblong-ovate or ovate-lanceolate, acuminate at both ends, often serrulate; drupe elongated-ellipsoid, usually pointed. (*Forestiera* Poir.) — Wet river-banks and swamps, s. w. Ind. to Mo., s. to Tex.

4. CHIONÁNTHUS L. Fringe-tree

Calyx 4-parted, very small, persistent. Petals barely united at base. Stamens 2 (rarely 3 or 4), on the very base of the corolla, very short. Stigma notched. Drupe fleshy, globular, becoming 1-celled, 1–3-seeded. — Low trees or shrubs, with deciduous and entire petioled leaves, and delicate flowers in loose and drooping graceful panicles, from lateral buds. (Name from χιών, *snow*, and ἄνθος, *blossom*, alluding to the light and snow-white clusters of flowers.)

1. C. virgínica L. (Old Man's Beard.) Leaves oval, oblong, or obovate-lanceolate; flowers on slender pedicels; petals 2–2.5 cm. long, narrowly linear, acute, varying to 5 or 6 in number; drupe purple, with a bloom, ovoid, 1–1.8 cm. long. — River-banks, N. J. and Pa. to Fla., Tex., and Mo. — Very ornamental in cultivation. May, June.

5. LIGÚSTRUM [Tourn.] L. Privet

Calyx short-tubular, 4-toothed, deciduous. Stamens 2, on the tube of the corolla, included. Berry 2-celled, 1–2-seeded. — Shrubs with entire leaves and small white flowers in terminal panicles. (The classical name.)

1. L. vulgàre L. (Privet or Prim.) Leaves very smooth; berries black. — Used for low hedges, and naturalized from Me. to Ont. and N. C. June, July. (Introd. from Eu.)

LOGANIÀCEAE (Logania Family)

Herbs, shrubs, or trees, with opposite and entire leaves, and stipules or a stipular membrane or line between them, and with regular 4–5-merous 4–5-androus perfect flowers, the ovary free from the calyx; a connecting group between *Gentianaceae*, *Apocynaceae*, *Scrophulariaceae* (from all which they are known by their stipules) and *Rubiaceae*, from which they differ in their

free ovary; our representatives of the family are related most nearly to the *Rubiaceae*, to which, indeed, they have been appended.

* Woody twiners; leaves evergreen; stigmas 2, each 2-parted.

1. **Gelsemium.** Corolla large, the 5 lobes imbricated in the bud. Style slender.

** Herbs; stigmas single, entire or 2-lobed.

2. **Spigelia.** Corolla 5-lobed, valvate in the bud. Style single, jointed in the middle.
3. **Cynoctonum.** Corolla 5-lobed, valvate in the bud. Styles 2, short, converging, united at the summit, and with a common stigma.
4. **Polypremum.** Corolla 4-lobed, not longer than the calyx, imbricated in the bud.

1. GELSÈMIUM Juss. Yellow (False) Jessamine

Corolla open-funnel-form. Stamens 5, with oblong sagittate anthers. Divisions of stigma linear. Capsule elliptical, flattened contrary to the narrow partition, 2-celled, septicidally 2-valved. Seeds many or several, winged. Embryo straight, in fleshy albumen; the ovate flat cotyledons much shorter than the slender radicle. — Smooth twining shrubby plants with ovate or lanceolate leaves, minute deciduous stipules, and showy yellow dimorphous flowers. (*Gelsomino*, the Italian name of the Jessamine.)

1. **G. sempérvirens** (L.) Ait. f. Stem climbing high; leaves short-petioled, shining, nearly persistent; flowers in short axillary clusters; pedicels scaly bracted; flowers very fragrant; corolla 2.5–4 cm. long; capsule flat, pointed. — Low grounds, e. Va. to Fla. and Tex. Mar., Apr.

2. SPIGÈLIA L. Pink-root. Worm-grass

Corolla tubular-funnel-form, 5-lobed at the summit. Stamens 5; anthers linear. Style slender, hairy above. Capsule short, 2-celled, twin, laterally flattened, separating at maturity from a persistent base into 2 carpels, which open loculicidally, few-seeded. — Chiefly herbs, with opposite leaves united by stipules, and the flowers spiked in one-sided cymes. (Named for *Adrian Spiegel*, latinized *Spigelius*, who wrote on botany early in the 17th century, and was perhaps the first to give directions for preparing an herbarium.)

1. **S. marilándica** L. (Indian Pink.) Stems simple and erect, 3–6 dm. high, from a perennial root; leaves sessile, ovate-lanceolate, acute; spike simple or forked, short; corolla 3–5 cm. long, red outside, yellow within; tube 4 times the length of the calyx, the lobes lanceolate; anthers and style exserted. — Rich woods, O. and Ky. to Fla., Mo., and Tex. May, June.

3. CYNÓCTONUM J. F. Gmel. Miterwort

Corolla little longer than the calyx, somewhat funnel-form. Stamens 5, included. Ovary at the base slightly adnate to the bottom of the calyx, 2-celled. Capsule exserted, strongly 2-horned or miter-shaped, opening down the inner side of each horn, many-seeded. — Annual smooth herbs, 1–7 dm. high, with small stipules between the leaves, and small white flowers spiked along one side of the branches of a terminal peduncled cyme. (Κύων, *dog*, and κτείνειν, *to kill*.) Mitreola R. Br.

1. **C. Mitréola** (L.) Britton. Leaves thin, oblong-lanceolate, petioled. (*M. petiolata* T. & G.) — Damp soil, from e. Va. to Tex. June–Nov.

4. POLYPRÈMUM L.

Calyx 4-parted; the divisions awl-shaped from a broad scarious-margined base. Corolla almost wheel-shaped, bearded in the throat. Stamens 4, very short; anthers globular. Style very short; stigma ovoid, entire. Capsule ovoid, a little flattened, notched at the apex, 2-celled, loculicidally 2-valved,

many-seeded. — A smooth diffuse much branched small annual, with narrowly linear or awl-shaped leaves connected at base by a slight stipular line; the small flowers solitary and sessile in the forks and at the ends of the branches; corolla inconspicuous, white. (Name altered from πολύπρεμνος, *many-stemmed.*)

1. **P. procúmbens** L. — Dry fields, mostly in sandy soil, Md. to Fla., Tex., and Mo.; also adventive in N. J. and Pa. June–Oct.

GENTIANÀCEAE (Gentian Family)

Smooth herbs, with a colorless bitter juice, opposite and sessile entire and simple leaves (except in no. 9) *without stipules, regular flowers with the stamens as many as the lobes of the corolla, which are convolute (rarely imbricated and sometimes valvate) in the bud, a 1-celled ovary with 2 parietal placentae, or nearly the whole inner face of the ovary ovuliferous; the fruit usually a 2-valved and septicidal many-seeded capsule.* Calyx persistent. Corolla mostly withering-persistent; the stamens inserted on its tube. Seeds anatropous, with a minute embryo in fleshy albumen. — Bitter-tonic plants.

Subfamily I. GENTIANOÍDEAE

Leaves always simple and entire, sessile, never alternate. Aestivation of corolla never valvate.

* Lobes of corolla convolute in the bud.

+ Style filiform, usually deciduous; anthers oblong to linear, mostly twisting or curving in age.

1. **Sabatia.** Parts of flower 5–12. Corolla rotate. Anthers recurved or revolute.
2. **Centaurium.** Parts of flower 5 or 4. Corolla salver-form. Anthers twisting spirally.

+ + Style stout and persistent or none; anthers remaining straight.

++ Corolla with scale-like appendages but no large pits or glands at base.

3. **Gentiana.** Corolla funnel-form or bell-shaped, mostly plaited in the sinuses. Calyx 4–5-cleft.
4. **Pleurogyne.** Corolla rotate. Calyx 4–5-parted.

++ ++ Corolla with a large pit or gland at the base of each lobe.

5. **Frasera.** Corolla 4-parted, rotate; a fringed glandular spot on each lobe.
6. **Halenia.** Corolla 4–5-cleft, campanulate, and usually 4–5-spurred at the base.

* * Lobes of corolla imbricate in the bud; no appendages nor glands.

7. **Bartonia.** Calyx 4-parted. Corolla deeply 4-cleft, somewhat campanulate.
8. **Obolaria.** Calyx of 2 foliaceous sepals. Corolla 4-lobed, oblong-campanulate.

Subfamily II. MENYANTHOÍDEAE

Leaves all alternate and mostly petioled, sometimes trifoliolate or crenate. Aestivation of corolla induplicate-valvate. Marsh or aquatic perennials.

9. **Menyanthes.** Corolla bearded inside. Leaves 3-foliolate.
10. **Nymphoides.** Corolla naked, or bearded on the margins only. Leaves simple, rounded.

1. SABÀTIA Adans.

Calyx 5–12-parted, the lobes slender. Corolla 5–12-parted, wheel-shaped. Stamens 5–12; anthers soon recurved. Style 2-cleft or -parted, slender. — Biennials or annuals (rarely perennial by stolons), with slender stems, and cymose-panicled handsome (white or rose-purple) flowers in summer. (Dedicated, it is said, to *L. Sabbati*, an early Italian botanist.) Sabbatia Salisb.

* *Corolla 5-parted, or rarely 6–7-parted.*

+ *Branches all opposite and stems more or less 4-angled; flowers cymose; calyx with long and slender lobes.*

++ *Corolla white, often turning yellowish in drying.*

1. **S. paniculàta** (Michx.) Pursh. *Stem much branched*, 2–7 dm. high; *leaves linear or the lower oblong, obtuse*, 1-*nerved*, nearly equaling the internodes; calyx-lobes much shorter than the corolla. — Low grounds, Va. to Fla.

2. **S. lanceolàta** (Walt.) T. & G. *Stem simple*, 4–9 dm. high, bearing a flat-topped cyme; *leaves ovate-lanceolate or ovate*, 3-*nerved*, the upper acute, much shorter than the internodes; calyx-lobes longer and flowers larger than in no. 1. — Wet pine barrens, N. J. to Fla.

++ ++ *Corolla rose-pink, rarely white, with a yellowish or greenish eye.*

3. **S. brachiàta** Ell. *Stem slightly angled*, simple below, 3–6 dm. high; *leaves linear and linear-oblong, obtuse*, or the upper acute; branches rather few-flowered, forming a panicle; calyx-lobes nearly half shorter than the corolla. (*S. angustifolia* Britton.) — Dry or low places, Ind. and N. C. to La. and Fla.

4. **S. angulàris** (L.) Pursh. *Stem somewhat 4-wing-angled*, much branched above, 3–9 dm. high, many-flowered; *leaves ovate*, acutish, 5-nerved, with a *somewhat heart-shaped clasping* base; calyx-lobes one third or half the length of the corolla. — Rich soil, N. Y. to Ont. and Mich., s. to Fla. and La.

+ + *Branches alternate (or the lower opposite in no. 5); peduncles 1-flowered.*

++ *Calyx-lobes foliaceous.*

5. **S. calycìna** (Lam.) Heller. Diffusely forking, pale, 1–5 dm. high; leaves oblong or lance-oblong, narrowed at base; calyx-lobes spatulate-lanceolate, 1–2 cm. long, exceeding the rose-colored or almost white corolla. (*S. calycosa* Pursh.) — Sea-coast and near it, Va. to Tex.

++ ++ *Calyx-lobes slender and tube very short (prominently costate in no. 6, and longer, nearly or quite inclosing the retuse capsule).*

6. **S. campéstris** Nutt. Stem 0.5–4 dm. high, divergently branched above; *leaves ovate with subcordate clasping base*, 1–3 cm. long, on the branches lanceolate; calyx equaling the lilac corolla (3–4.5 cm. broad). — Prairies, Mo. to Tex.

7. **S. stellàris** Pursh. Loosely branched and forking; *leaves oblong to lanceolate*, the upper narrowly linear; *calyx-lobes awl-shaped-linear, varying from half to nearly the length of the bright rose-purple corolla; style nearly 2-parted.* — Salt marshes, Mass. to Fla. — Appears to pass into the next; corolla in both at times pink or white.

8. **S. grácilis** (Michx.) Salisb. *Stem very slender*, at length diffusely branched; branches and long peduncles filiform; *leaves linear*, or the lower lance-linear, the uppermost similar to the *setaceous calyx-lobes, which equal the rose-purple corolla; style cleft to the middle.* (*S. campanulata* Torr.?) — Brackish marshes, s. e. Mass. and N. J. to Fla. and La.

* * *Corolla 8–12-parted, large (3–5.5 cm. broad).*

9. **S. dodecándra** (L.) BSP. Stem 1–6 dm. high, loosely panicled above; peduncles slender, 1-flowered; leaves oblong-lanceolate; calyx-lobes linear, half the length of the deep rose-colored (rarely white) corolla. (*S. chloroides* Pursh.) — Borders of brackish ponds, Mass. to N. C.

2. CENTAÚRIUM Hill. Centaury

Calyx 4–5-parted, the divisions slender. Corolla funnel-form or salver-form, with slender tube and 4–5-parted limb. Anthers exserted, erect, twisting spirally. Style slender, single; stigma capitate or 2-lipped. — Low and small branching annuals, chiefly with rose-purple or reddish flowers in summer. (An

old name, variously applied by the herbalists, from *centum*, hundred, and *aurum*, gold or gold-piece, alluding, it is said, to the priceless medicinal value; compare the German vernacular name *Tausendgüldenkraut.*) ERITHREA Neck. ERYTHRAEA Borkh.

* *Flowers in spikes.*

1. C. SPICÀTUM (L.) Fernald. Stem strictly upright, 1–4 dm. high; the *flowers sessile and spiked along one side of the simple or rarely forked branches;* leaves oval and oblong, rounded at base, acutish; tube of the rose-colored or whitish corolla scarcely longer than the calyx, the lobes oblong. (*Erythraea* Pers.) — Sandy coast, Nantucket, Mass., and Portsmouth, Va. (Nat. from Eu.)

** *Flowers in cymes or panicles.*

← *Flowers in definite terminal cymes, at least the central flower sessile.*

2. C. UMBELLÀTUM Gilib. (CENTAURY.) Stem upright, 1–5 dm. high, *corymbosely branched* above; leaves oblong or elliptical, acutish, the basal rosulate, the uppermost linear; *cymes clustered, flat-topped, the flowers all nearly sessile;* tube of the purple-rose-colored corolla not twice the length of the oval lobes. (*Erythraea Centaurium* Pers.) — Waste grounds, N. S.; Mass. to Ind. and Mich (Nat. from Eu.)

← ← *Flowers loosely paniculate or paniculate-cymose, all pediceled.*

↔ *Corolla-lobes 3–5 mm. long; anthers oblong.*

3. C. PULCHÉLLUM (Sw.) Druce. Low (0.5–3 dm. high); *stem many times forked above and forming a diffuse cyme; leaves ovate-oblong or oval,* not rosulate below; *pedicels shorter than the calyx;* tube of the pink-purple corolla thrice the length of the elliptical-oblong lobes. (*Erythraea ramosissima* Pers.) — Wet or shady places, N. Y. to Ill., and southw. (Nat. from Eu.)

4. C. texénse (Griseb.) Fernald. Similar to the preceding, but more diffusely forked; *cauline leaves linear or linear-lanceolate, the upper reduced to subulate bracts; pedicels equaling or exceeding the calyx;* corolla-tube twice the length of the lance-oblong lobes. (*Erythraea* Griseb.) — Dry soil, Mo. to Tex.

↔ ↔ *Corolla-lobes 7–10 mm. long; anthers linear.*

5. C. calycòsum (Buckley) Fernald. Simple or corymbose-branched, 1–6 dm. high; leaves oblong to lance-linear; pedicels equaling or exceeding the calyx; corolla-tube nearly equaled by the oblong or oval lobes. (*Erythraea* Buckley.) — Damp soil, Mo. to Tex.

3. GENTIÀNA [Tourn.] L. GENTIAN

Corolla 4–5-lobed, usually with intermediate plaited folds, which bear appendages or teeth at the sinuses. Stamens inserted on the tube of the corolla. Style short or none; stigmas 2, persistent. Capsule ellipsoid, 2-valved, the innumerable seeds either borne on placentae at or near the sutures, or in most of our species covering nearly the whole inner face of the pod. — Flowers solitary or cymose, showy, in late summer and autumn. (Name from *Gentius*, king of Illyria, who according to Pliny discovered the plant, *i.e.* its medicinal virtue.)

§ 1. GENTIANÉLLA [Rupp.] Reichenb. *Corolla (not rotate) destitute of extended plaits or lobes or teeth at the sinuses; root annual or biennial.*

* *Flowers large, solitary on long terminal peduncles, mostly 4-merous; corolla campanulate-funnel-form, its lobes usually fimbriate or erose, not crowned; a row of glands between the bases of the filaments.*

1. G. crinita Froel. (FRINGED G.) Stem 1–9 dm. high; *leaves lanceolate or ovate-lanceolate from a partly heart-shaped or rounded base;* lobes of the 4-cleft calyx unequal, ovate and lanceolate, as long as the bell-shaped tube of the blue (rarely white) corolla (2.5–6 cm. long), the *lobes* of which are *wedge-obovate, and strongly fringed around the summit; ovary lanceolate.* — Low grounds, centr. Me. and w. Que. to Dak., Ia., O., and Ga.

2. G. prócera Holm. Stem 1.5–5 dm. high; *leaves linear or lance-linear, acute, the basal spatulate; lobes of the* 4-cleft *calyx* unequal, alternately lance-triangular and linear-lanceolate, *all* pointed and *keeled and scabrous on the back; lobes of the* sky-blue *corolla roundish, with ciliate-fringed margins and merely dentate summit; ovary elliptical.* (*G. serrata* Man. ed. 6, not Gunner; *G. detonsa* Am. auth., not Rottb.) — Moist grounds, N. Y. and Ont. to Man. and Ia.

* * *Flowers smaller, 4–5-merous; corolla somewhat funnel-form or salver-form, its lobes entire; peduncles short or none, terminal and lateral on the acute-angled stem.*

3. G. Amarélla L. Stems 0.5–6 dm. high; leaves lanceolate to narrowly oblong, or the lowest obovate-spatulate, the margins minutely scabrous; calyx-lobes (4–5) foliaceous, lanceolate or linear; *corolla* blue, lavender, or white, 8–15 mm. long, *with a fimbriate crown at the base of the oblong acute lobes; capsule sessile.* Eurasia.

Var. acùta (Michx.) Herder. Calyx almost 5-parted; crown usually of fewer and sometimes very few setae. (*G. acuta* Michx.) — Barrens, meadows, and rocky banks, Lab. to Alaska, s. to n. N. B., n. Me., n. Vt., Minn., N. Dak., N. Mex., and Cal. (Asia.)

4. G. quinquefòlia L. Slender, simple or branching, 0.5–6 dm. high; leaves ovate-lanceolate from a partly clasping and heart-shaped base, 3–7-nerved, tipped with a minute point; branches racemed or panicled, about 5-flowered at the summit; lobes of the small 5-cleft calyx awl-shaped-linear; *corolla* pale blue or ochroleucous, 1–2 cm. long, its *lobes triangular-ovate, bristle-pointed, without crown, but the glands at the base* of the slender obconical tube *manifest; capsule stipitate.* (*G. quinqueflora* Hill, a more appropriate but later name.) — Moist hills, s. Me. to Ont., Ill., and Fla. Var. OCCIDENTÀLIS (Gray) Hitchc. Often taller and paniculately much branched; calyx-lobes more leaf-like, linear-lanceolate to oblong-lanceolate, reaching to the middle of the broader funnel-form corolla. — O. to Minn., and southw.

§ 2. PNEUMONÁNTHE [Gleditsch] Link. *Corolla (funnel-form or salver-form) with thin-membranaceous toothed or lobed plaits in the sinuses; no crown nor glands; capsule stipitate; autumn-flowering perennials, the flowers large, sessile or short-pedunculate and bibracteate* (except in no. 12).

* *Anthers unconnected or soon separate; leaves rough-margined; seeds winged.*

5. G. affìnis Griseb. *Stems clustered,* 1–4.5 dm. high; leaves oblong or lanceolate to linear; *flowers numerous and thyrsoid-racemose* or few or rarely almost solitary; *calyx-lobes unequal,* the longest rarely equaling the tube, the shortest sometimes minute; *corolla* blue or bluish, 2–3 cm. long, rather *narrowly funnel-form,* with ovate spreading lobes, the plaits with *conspicuous laciniate appendages sometimes equaling the lobes.* — Damp soil, Minn. and westw.

6. G. pubérula Michx. *Stems mostly solitary,* erect or ascending, 1.5–5 dm. high, mostly *rough* and minutely pubescent above; *leaves rigid,* linear-lanceolate to oblong-lanceolate, 2–7 cm. long; *flowers clustered,* rarely solitary; *calyx-lobes lanceolate,* much shorter than the *bell-funnel-form open bright blue corolla,* the spreading ovate *lobes* of which are *twice or thrice the length of the cut-toothed appendages.* — Dry prairies and barrens, Md. to Ga., Kan., and Minn. Oct.

* * *Anthers cohering in a ring or short tube; flowers in terminal and often axillary clusters.*

+ *Calyx-lobes and bracts ciliolate-scabrous; seeds conspicuously winged; leaves somewhat rough-margined.*

7. G. Saponària L. (SOAPWORT G.) Stem erect or ascending, smooth; leaves ovate-lanceolate, oblong, or lanceolate-obovate, narrowed at the base; *calyx-lobes linear or spatulate,* acute, *equaling or exceeding the tube,* half the length of the corolla; *lobes* of the club-bell-shaped light blue corolla obtuse,

erect or converging, short and broad, but *distinct*, and more or less *longer than the conspicuous* 2-cleft and minutely toothed *appendages.* — Moist woods, Ct. to Ont., and southw.

8. G. **Andréwsii** Griseb. (Closed G.) Stems upright, smooth; leaves ovate-lanceolate and lanceolate from a narrower base, gradually pointed; *calyx-lobes lanceolate to obovate*, recurved, *shorter than the top-shaped tube*, and much shorter than the more cylindric and truncate mostly blue corolla, which is closed at the mouth, *the proper lobes equaled by the broad notched appendages.* — Moist ground, s. Me. to Man., and southw. — Corolla blue with white plaits, or sometimes all white.

+ + *Margins of leaves, bracts, etc., smooth and naked; terminal flower-cluster leafy-involucrate; seeds winged.*

9. G. **flávida** Gray. Stems upright, stout; flowers sessile and crowded in a dense terminal cluster; *leaves ovate-lanceolate from a heart-shaped closely clasping base*, gradually tapering; *calyx-lobes ovate or subcordate*, many times shorter than the tube of the corolla, *reflexed-spreading;* corolla white, more or less tinged with greenish or yellowish, inflated-club-shaped, at length open, its short and broad ovate lobes twice the length of the broad toothed appendages. (*G. alba* Man. ed. 6, not Muhl.) — Sandy woods and meadows, Ont. to Mo., Ky., and Va.

10. G. **lineàris** Froel. Stems slender and strict, 2.5–7 dm. high; flowers 1–5 in the terminal cluster; *leaves linear or lanceolate, with somewhat narrowed base;* bracts sometimes very finely scabrous; *calyx-lobes appressed-ascending, linear or lanceolate, mostly subequal;* corolla blue or white, slender-funnel-form, its erect roundish-ovate lobes a little longer than the triangular appendages. (*G. rubricaulis* Schwein.) — Bogs and wet rocks, N. B. to Ont., Minn., N. Y., and Md.

Var. **latifòlia** Gray. Stout; *leaves closely sessile, not contracted at base*, the lowest oblong-linear, *the upper ovate-lanceolate; calyx-lobes unequal;* appendages broad, acute or subtruncate, mostly thrice exceeded by the corolla-lobes. — L. Superior; N. B.

+ + + *Calyx-lobes and bracts with the margins smooth or nearly so; seeds completely marginless.*

11. G. **villòsa** L. (Sampson's Snakeroot.) Stems ascending, smooth; leaves from broadly obovate and obtuse to somewhat lanceolate, all narrowed at base; calyx-lobes linear, unequal, much longer than the tube, rather shorter than the greenish-white open corolla, which is painted inside with green veins and lilac-purple stripes; corolla-lobes ovate, much exceeding the small sparingly toothed oblique appendages. (*G. ochroleuca* Froel.) — Dry or damp grounds, N. J. and Pa. to Fla. and La.

* * * *Anthers not connected; flowers terminal, solitary, commonly peduncled and naked; seeds wingless.*

12. G. **Porphýrio** J. F. Gmel. Stems slender and ascending, 1–4.5 dm. high, mostly simple; leaves linear or the lower oblanceolate, rigid; corolla open-funnel-form, 4–6 cm. long, azure-blue, rarely greenish or white, about twice the length of the thread-like calyx-lobes, its ovate spreading lobes twice as long as the cut-toothed appendages. (*G. angustifolia* Michx.) — Moist pine barrens, N. J. to Fla.

4. PLEURÓGYNE Esch.

Acute divisions of the showy corolla with a pair of scale-like appendages at base. Stamens inserted at base of corolla. Style none; stigmas decurrent. — Small annuals of cold regions. (Name from πλευρόν, *rib* or *side*, and γυνή, *female;* referring to the decurrent lateral, not terminal, stigmas.)

1. P. **rotàta** (L.) Griseb. (Marsh Felwort.) Stem 0.5–3 dm. high, from simple and 1-flowered to fastigiate-branched and many-flowered; leaves linear or lanceolate, or the lowest spatulate; sepals linear to lanceolate, resembling the upper leaves, and often much elongated; corolla blue or white, the 3–5 ovate-

oblong or lanceolate lobes (5–15 mm. long) shorter than or exceeding the calyx-lobes. (Including *P. carinthiaca*, var. *pusilla* Gray.) — Brackish shores and marshes, e. Que., Nfd., Lab., and northw.; Rocky Mts. — Pursh's report of the plant from the White Mts., N. H., was probably erroneous. Aug., Sept. (Greenl., n. Eurasia.)

5. FRASÈRA Walt. American Columbo

Calyx deeply 4-parted. Filaments awl-shaped, usually monadelphous at base; anthers oblong, versatile. Style persistent; stigma 2-lobed. Capsule oval, flattened, 4–14-seeded. Seeds large and flat, wing-margined. — Tall and showy herbs, with thick root, upright mostly simple stems, whorled leaves, and numerous peduncled flowers in open cymes, disposed in an ample elongated panicle. (Named for *John Fraser*, an 18th century collector.)

1. **F. caroliniénsis** Walt. Smooth biennial or triennial, 1–2.5 m. high; leaves mostly in fours, lance-oblong, the lowest spatulate, veiny; panicle pyramidal, loosely flowered; corolla 2–3 cm. broad, light greenish-yellow, marked with small brown-purple dots, its divisions oblong, mucronate, longer than the narrowly lanceolate calyx-lobes, each with a large round gland below the middle; capsule much flattened parallel with the flat valves. — Rich dry soil, N. Y. and Ont. to Wisc., and southw. May, June.

6. HALÈNIA Borkh. Spurred Gentian

Calyx 4–5 parted. Corolla without folds or fringe, usually prolonged at the base underneath the erect lobes into spurs, which are glandular in the bottom. Stigmas 2, sessile, persistent on the oblong flattish capsule. Seeds rather numerous, oblong. — Small and upright herbs, with yellowish or purplish panicled-cymose flowers. (Named for *Johann Halen*, a German botanist.) Tetragonanthus Gmel.

1. **H. defléxa** (Sm.) Griseb. Leafy annual or biennial, 1–9 dm. high, simple or branched above; *leaves* 3–5-nerved, the lowest oblong-spatulate and petioled, the others *oblong-lanceolate to ovate, acuminate, the nodes mostly remote; spurs cylindrical*, obtuse, curved, descending, *half the length of the acutely 4-lobed corolla.* (*Tetragonanthus* Ktze.) — Damp and cool woods, Nfd. and Lab. to Sask., s. to centr. Me., w. Mass., centr. N. Y., Mich., and Minn. July–Sept. Var. heterántha (Griseb.) Fernald. Lower or sometimes all the *flowers without spurs.* — Nfd. and Lab. to Me. and Mich.

7. BARTÒNIA Muhl.

Stamens short. Capsule oblong, flattened, pointed with a large persistent at length 2-lobed stigma. Seeds minute, innumerable, covering the whole inner surface of the pod. — Small annuals or biennials with thread-like stems, and little awl-shaped scales in place of leaves. Flowers small, peduncled. (Dedicated to *Prof. Benjamin Smith Barton*, of Philadelphia.)

* *Corolla-lobes oblong to spatulate, obtuse, usually denticulate.*

← *Flowers 7–9 mm. long; corolla-lobes spatulate, more than twice as long as the calyx-lobes.*

1. **B. vérna** (Michx.) Muhl. Stem 1–few-flowered, 4–25 cm. high, nearly naked; leaf-scales inconspicuous, remote, mostly opposite or nearly so; corolla-lobes narrowly spatulate to spatulate-obovate, obtuse, denticulate or subentire, 2–3 times as long as the calyx-lobes. — Bogs near the coast, s. Va. to Fla. and La. Mar.–May.

← ← *Flowers 3–4 mm. long; corolla-lobes one third to one half longer than the calyx-lobes or rarely twice their length.*

2. **B. virgínica** (L.) BSP. Stems yellowish, 5–30 cm. high, erect and straight or irregularly flexuous, mostly sharp-angled, simple or forked at the hard sub-

ligneous base, with numerous mostly opposite or subopposite subulate scales below; the branches or peduncles chiefly opposite, 1–few-flowered; flowers yellowish-white; corolla-lobes oblong, commonly denticulate, obtusish to rounded at the apex; stigma columnar, about 1 mm. long. (*B. tenella* Muhl.) — Sandy or boggy places, N. S. to Minn., and southw. July–Sept.

** *Corolla-lobes lanceolate or ovate-lanceolate, acute or acutish, essentially entire.*

3. **B. paniculàta** (Michx.) Robinson. Tall and very slender, 2–4 dm. high, more apt to be irregularly and paniculately branched above, but mostly simple at the base; branches and leaf-scales often alternate; the peduncles curved-ascending; *flowers* 2–4(–5) *mm. long; corolla-lobes lanceolate*, acute, yellowish- or greenish-white, about twice as long as the narrowly lanceolate calyx-lobes; stigma short, scarcely columnar, 0.5 mm. in length; *anthers yellow.* (*B. lanceolata* Small; *Centaurella paniculata* Michx.; *C. Moseri* Steud. & Hochstetter.) — Wet sandy woods, swamps, etc., e. Mass. to Fla. and La. Aug.–Oct.

4. **B. iodándra** Robinson. Dwarf and subsimple, 1–2 dm. high; scales few and often alternate as are the rather long curved-ascending peduncles; *flowers* for the most part nearly twice as large as in the preceding, purplish-tinged, 6 *mm. long; corolla-lobes ovate-lanceolate*, acutish, about twice the length of the lance-oblong calyx-lobes; *anthers chiefly brownish-purple;* stigma short. — Sphagnous bogs, Nfd. and N. S. Aug., Sept.

8. OBOLÀRIA L. Pennywort

Calyx of 2 spatulate spreading sepals, resembling the leaves. Corolla withering-persistent; the lobes oval-oblong, or with age spatulate, imbricated in the bud! Stamens inserted at the sinuses of the corolla, short. Style short, persistent; stigma 2-lipped. Capsule ovoid, 1-celled, the cell cruciform; the seeds covering the whole face of the walls. — A low and very smooth purplish-green perennial 6–15 cm. high, with a simple or sparingly branched stem, opposite wedge-obovate leaves; the dull white or purplish flowers solitary or in clusters of three, terminal and axillary, nearly sessile, in spring. (Name from ὀβολός, a small Greek coin, from the thick rounded leaves.)

1. **O. virgínica** L. Herbaceous and rather fleshy, the lower leaves scale-like; flowers 1 cm. long. — Moist woods, N. J. to Ill., s. to Ga. and Tex. Mar.–May.

9. MENYÂNTHES [Tourn.] L. Buckbean

Calyx 5-parted. Corolla short funnel-form, 5-cleft, deciduous, the whole upper surface white-bearded. Style slender, persistent; stigma 2-lobed. Capsule bursting somewhat irregularly, many-seeded. Seed-coat hard, smooth and shining. — A perennial herb, with a thickish creeping rootstock, sheathed by the membranous bases of the long petioles, which bear 3 oval or oblong leaflets; the flowers racemed on the naked scape (1–3 dm. high), white or slightly reddish. (The ancient Theophrastian name, probably from μήν, *month*, and ἄνθος, *a flower*, some say from its flowering for about that time.)

1. **M. trifoliàta** L. — Bogs and shallow water, Lab. to Alaska, s. to N. J., Pa., Great L. region, Ia., etc. Apr.–June. (Eurasia.)

10. NYMPHOÌDES [Tourn.] Hill. Floating Heart

Calyx 5-parted. Corolla almost wheel-shaped, 5-parted, the divisions bearing a glandular appendage near the base. Style short or none; stigma 2-lobed, persistent. Capsule few–many-seeded, at length bursting irregularly. Seed-coat hard. — Perennial aquatics, with floating leaves on very long petioles, which, in most species, bear near the summit the umbel of polygamous flowers, often along with a cluster of short and spur-like roots; flowering all summer. (Name from *Nymphaea* and εἶδος, *appearance.*) Limnanthemum S. P. Gmel.

1. **N. lacunòsum** (Vent.) Fernald. Floating leaves round-heart-shaped, 1.5–6

cm. broad, thickish; petioles filiform; lobes of the *white corolla* broadly oval, about 1 cm. long, naked, except the crest-like yellowish gland at the base, twice the length of the lanceolate calyx-lobes; style none; *seeds smooth and even.* (*Limnanthemum* Griseb.) — Shallow water, N. S. to Fla., and locally westw. July-Sept.

2. **N. aquáticum** (Walt.) Fernald. *Leaves larger* (0.5–1.5 dm. broad) and rounder, thicker, often wavy-margined or crenate, roughish and dark-punctate or pitted beneath; petioles stouter; flower 1–2 cm. broad; *seeds glandular-roughened.* (*Limnanthemum* Britton; *L. trachyspermum* Gray.) — Ponds and streams, N. J. to Fla. and Tex.

3. **N. peltàtum** (S. P. Gmel.) Britten & Rendle. Stout and branching; *petioles bearing no spur-like roots; corolla large* (2–3 *cm. broad*), *bright yellow*, the segments somewhat fringed; *seeds with fringe-like margin.* (*Limnanthemum nymphoides* Hoffmannsegg & Link.) — Ponds about Washington, D. C.; often cultivated. (Introd. from Eu.)

APOCYNÀCEAE (Dogbane Family)

Plants almost all with milky acrid juice, entire chiefly opposite leaves without stipules, regular 5-merous and 5-androus flowers; the 5 lobes of the corolla convolute and twisted in the bud; the filaments distinct, inserted on the corolla, and the pollen glandular; calyx free from the two ovaries, which (in our genera) are distinct (forming follicles), though their styles or stigmas are united into one. Seeds amphitropous or anatropous, with a large straight embryo in sparing albumen, often bearing a tuft of down (comose). — Chiefly tropical acrid-poisonous plants.

* Leaves alternate.

1. **Amsonia.** Seeds naked. Corolla-tube bearded inside. Anthers longer than the filaments. Plant upright.

* * Leaves opposite.

2. **Vinca.** Seeds naked. Corolla-tube naked. Plant creeping or trailing.
3. **Trachelospermum.** Seeds comose. Corolla funnel-form, not appendaged. Filaments slender. Calyx glandular inside.
4. **Apocynum.** Seeds comose. Corolla bell-shaped, appendaged within. Filaments short, broad and flat. Calyx not glandular.

1. AMSÒNIA Walt.

Calyx small. Corolla with a narrow funnel-form tube; the limb divided into long linear lobes. Stamens inserted on the tube, included; anthers obtuse at both ends. Ovaries 2; style 1; stigma rounded, surrounded with a cup-like membrane. Pods (follicles) 2, long and slender, many-seeded. Seeds cylindrical, abrupt at both ends, packed in one row. — Perennial herbs, with *alternate leaves*, and pale blue flowers in terminal panicled cymes. (Named for *Dr. Amson*, physician of Gloucester, Virginia, in 1760, and friend of John Clayton.)

1. **A. Tabernaemontàna** Walt. Loosely pubescent or hairy when young, soon glabrous; leaves from ovate-lanceolate to linear-lanceolate, taper-pointed; calyx-lobes short, awl-shaped; tube of the bluish corolla little longer than the lobes, the upper part either hairy when young or glabrous. (*A. salicifolia* Pursh; *A. Amsonia* Britton.) — Low grounds, Pa. to Mo., and southw.; introd. in N. J. May, June.

2. VÍNCA L. Periwinkle

Calyx-lobes acuminate. Corolla-tube funnel-form; the limb salver-form. Stamens inserted below the throat; filaments short. Style slender. Pods short-cylindric. Seeds rough. — Smooth trailing hardy plants (or in the Tropics

tender annuals) with evergreen firm leaves and axillary flowers. (Ancient Latin name of uncertain derivation.)

1. **V. mìnor** L. (Common P., "Myrtle.") Spreading by creeping stems; leaves glossy, ovate to oblong, 1.5–3 cm. long; flowers peduncled; corolla blue, with truncate lobes. — Roadsides, etc., escaped from cultivation. Apr.–June. (Introd. from Eu.)

3. TRACHELOSPÉRMUM Lemaire. Climbing Dogbane

Calyx with 3–5 glands at its base inside. Stamens included; anthers arrow-shaped, with an inflexed tip. Pods (follicles) 2, slender, many-seeded. Seeds oblong. — Twining plants, more or less woody, with small flowers in cymes. (Name from *τράχηλος, a neck*, and *σπέρμα, seed*, upon the supposition that the seed was beaked.)

1. **T. diffórme** (Walt.) Gray. Nearly herbaceous and glabrous; leaves oval-lanceolate, pointed, thin; calyx-lobes taper-pointed; corolla pale yellow. — Damp grounds, Del. to Fla. and Tex. June, July.

4. APÓCYNUM [Tourn.] L. Dogbane. Indian Hemp

Calyx-lobes acute. Corolla bell-shaped, bearing 5 triangular appendages below the throat opposite the lobes. Stamens on the very base of the corolla; filaments shorter than the arrow-shaped convergent anthers, which slightly adhere to the stigma. Style none; stigma large, ovoid, slightly 2-lobed. Fruit of 2 long and slender follicles. Seeds with a tuft of long silky down at the apex. — Perennial herbs, with upright branching stems, opposite mucronate-pointed leaves, a tough fibrous bark, and small and pale cymose flowers on short pedicels. (Ancient name of the Dogbane, composed of *ἀπό, from*, and *κύων, a dog.*)

* *Corolla pink or pink-striped or white, 4–9 mm. long, the lobes more or less spreading.*

← *Inflorescences both terminal and axillary cymes of nodding flowers 6–9 mm. long; corolla campanulate, the lobes prominently flaring.*

1. **A. androsaemifòlium** L. (Spreading D.) Stems smooth, 3–5 dm. high, *loosely wide-branched above with ascending often dichotomous branches; leaves* ovate to ovate-oblong, mucronate-tipped, *slender-petioled, loosely spreading or drooping, dull dark green* and smooth *above*, pale and usually somewhat pubescent beneath; *cymes flowering simultaneously*, the terminal usually largest; *flowers* fragrant, *mostly nodding;* calyx rarely half as long as the corolla-tube; corolla pink, with deeper stripes in the tube, *the finally recurved lobes* blunt. — Dry thickets, open woods, etc. June–Aug.

← ← *Inflorescences terminal or at the tips of leafy branches, of spreading or slightly nodding flowers 4–7 mm. long; corolla from urceolate to short-tubular, the tube somewhat pentagonal, the lobes slightly spreading.*

2. **A. mèdium** Greene. Similar to no. 1; the branches ascending or spreading; leaves firm, ovate-oblong to elliptic, glabrous or slightly pubescent beneath; *central cyme flowering earlier than those at the tips of the elongate branches; corolla* white or pink-tinged, the blunt *lobes slightly spreading but not recurved.* (Intermediate between the preceding and the following, including *A. speciosum* and *A. urceolifer* G. S. Miller, *A. Milleri* Britton, and some other recently proposed species.) — Open dry or moist ground, rocky shores, etc., e. Que. to Md., w. to Col. June–Aug.

* * *Corolla greenish to greenish-white, tubular, pentagonal, 3–4.5 mm. long, the lobes ascending; cymes terminal, of mostly ascending flowers.*

3. **A. cannabìnum** L. (Indian Hemp.) Glabrous, 2–24 dm. high, the stems and branches ascending (but on gravel beaches, etc., depressed and wide-spreading), *leaves* mostly ascending, *usually pale green*, ovate-oblong to lanceolate, glabrous

or sparingly pubescent beneath, *those of the chief axis narrowed at base to distinct petioles* (2–7 mm. long), *those of the branches often subsessile; central cyme flowering first; flowers erect;* calyx glabrous, its lobes about equaling the corolla-tube. — Gravelly or sandy soil, mostly near streams; on beaches becoming dwarfed and diffuse, with smaller and narrower leaves (*A. album* Greene). June–Aug. Varying greatly, the most recognizable extremes being

Var. **pubéscens** (R. Br.) DC. Calyx and pedicels pubescent; leaves white-pubescent beneath. (*A. pubescens* R. Br.) — R. I. to Ont., Ia., and southw.

Var. **nemoràle** (G. S. Miller) Fernald. Leaves mostly spreading or drooping on elongate (1–1.5 cm. long) slender petioles. (*A. nemorale* G. S. Miller.) — Open woods, Fairfax Co., Va.

Var. **hypericifòlium** (Ait.) Gray. Principal leaves sessile or subsessile, rounded or subcordate at base. (*A. hypericifolium* Ait.) — Que. to Sask. and B. C., s. to w. Me., centr. N. Y., O., Kan., Col., and Cal.; chiefly westw.

ASCLEPIADÀCEAE (Milkweed Family)

Plants with milky juice, and opposite or whorled (rarely scattered) entire leaves; the follicular pods, seeds, anthers (connected with the stigma), sensible properties, etc., as in the preceding family, from which they differ in the commonly valvate corolla, and in the singular connection of the anthers with the stigma, the cohesion of the pollen into wax-like or granular masses (pollinia), etc., as explained under the typical genus *Asclepias.*

Tribe I. CYNANCHEAE. Anthers tipped with an inflexed or sometimes erect scarious membrane, the cells lower than the top of the stigma; pollinia suspended.

* Stems erect or merely decumbent.

1. **Asclepiodora.** Corolla rotate, merely spreading. Crown of 5 hooded fleshy bodies, with a salient crest in each. Leaves alternate.
2. **Asclepias.** Corolla reflexed, deeply 5-parted. Crown as in no. 1, but with an incurved horn rising from the cavity of each hood. Leaves usually opposite.
3. **Acerates.** Corolla reflexed or merely spreading. Crown as in no. 1, but with neither crest nor horn inside. Leaves mainly alternate.

* * Stems twining; leaves mostly opposite.

4. **Gonolobus.** Corolla erect. Crown of 5 membranaceous flat bodies, terminated by a 2-cleft tail or awn.
5. **Cynanchum.** Corolla rotate, spreading. Crown a fleshy 5–10-lobed ring or disk.

Tribe II. VINCETOXÍCEAE. Anthers with short if any scarious tip, borne on the margin of or close under the disk of the stigma; pollinia horizontal.

6. **Vincetoxicum.** Corolla rotate. Crown a wavy-lobed fleshy ring. Stems twining.

1. ASCLEPIODÒRA Gray

Resembling *Asclepias;* but the corolla-lobes ascending or spreading, and the hoods destitute of a horn, widely spreading and somewhat incurved, slipper-shaped and laterally compressed, the cavity divided at the apex by a crest-like partition. — Umbels solitary and terminal or corymbed, loosely-flowered. Follicles ovoid, often somewhat muricate with soft spinous projections. (Ἀσκληπιός, and δῶρον or δωρεά, *the gift of Aesculapius.*)

1. **A. víridis** (Walt.) Gray. Almost glabrous; stems 3–7 dm. high; leaves alternate, short-petioled, ovate-oblong to lanceolate, 3–13 cm. wide; umbels several in a cluster, short-peduncled; flowers large (2–3 cm. broad), green, with a purplish crown. — Prairies, Ill. to Tex. and S. C. May, June.

2. ASCLÈPIAS [Tourn.] L. Milkweed. Silkweed

Calyx persistent; divisions small, reflexed. Corolla deeply 5-parted; divisions valvate in bud, deciduous. Crown of 5 hooded bodies seated on the tube of

stamens, each containing an incurved horn. Stamens 5, inserted on the base of the corolla; filaments united into a tube which incloses the pistil; anthers adherent to the stigma, each with 2 vertical cells, tipped with a membranaceous appendage, each cell containing a flattened pear-shaped and waxy pollen-mass; the two contiguous pollen-masses of adjacent anthers, forming pairs which hang by a slender prolongation of their summits from 5 cloven glands that grow on the angles of the stigma (extricated from the cells by insects, and directing copious pollen-tubes into the point where the stigma joins the apex of the style). Ovaries 2, tapering into very short styles; the large depressed 5-angled fleshy stigmatic disk common to the two. Follicles 2, one of them often abortive, soft, ovoid or lanceolate. Seeds anatropous, flat, margined, bearing a tuft of long silky hairs (*coma*) at the hilum, downwardly imbricated all over the large placenta, which separates from the suture at maturity. Embryo large, with broad foliaceous cotyledons in thin albumen. — Perennial herbs; peduncles terminal or lateral and between the usually opposite petioles, bearing simple many-flowered umbels, in summer. (The Greek name of *Aesculapius*, to whom the genus is dedicated.)

§ 1. *Anther-wings broadest and usually angulate-truncate and salient at base; horn conspicuous.*

* *Flowers orange-color; leaves mostly scattered; juice not milky.*

1. **A. tuberòsa** L. (Butterfly-weed, Pleurisy-root.) Roughish-hairy, 3–9 dm. high; stems ascending or decumbent, very leafy, branching at the summit, and bearing umbels in a terminal corymb, or scattered in racemes along the branches; leaves from linear to oblong-ovate, sessile or slightly petioled; divisions of the corolla oblong, greenish-orange; hoods narrowly oblong, bright orange, scarcely longer than the nearly erect and slender awl-shaped horns; pods hoary, erect on deflexed pedicels. (Including *A. decumbens* L.) — Dry fields and banks, N. H. to Ont., Minn., southw. and southwestw. June–Aug.

* * *Corolla bright red or purple; follicles naked, fusiform, erect on the deflexed pedicels* (except in no. 5); *leaves opposite, mostly broad.*

← *Flowers rather large; hoods about 6 mm. long and exceeding the anthers; leaves transversely veined.*

2. **A. lanceolàta** Walt. Glabrous; stem slender, 6–15 dm. high; leaves elongated-lanceolate or linear, 1–2 dm. long, tapering to both ends, slightly petioled; *umbels 5–12-flowered;* divisions of the red corolla narrowly oblong; the *bright orange hoods* broadly oblong, obtuse, much exceeding the incurved horn. (*A. paupercula* Michx.) — Wet pine barrens on the coast, N. J. to Fla. and Tex. July.

3. **A. rùbra** L. *Glabrous; leaves ovate or lanceolate and tapering from a rounded or heart-shaped base* to a very acute point, sessile or nearly so, 0.5–1.8 dm. long, 1–6.5 cm. wide, bright green; umbels many-flowered; *divisions of the corolla and hoods oblong-lanceolate, purple-red; the horn long and slender, straightish.* — Wet pine barrens, etc., N. J. and Pa. to Fla., La., and Mo. July.

4. **A. purpuráscens** L. (Purple M.) Stem rather slender, 1 m. or less high; *leaves elliptical or ovate-oblong*, the upper taper-pointed, *minutely velvety-downy underneath*, smooth above, *contracted at base into a short petiole; pedicels* shorter than the peduncle, 3–4 *times the length of the dark purple lanceolate-ovate divisions of the corolla;* hoods oblong, abruptly narrowed above; *the horn broadly scythe-shaped, with a narrow and abruptly inflexed horizontal point.* — Dry ground, N. H. to Ont., Minn., Kan., and southw. — Flowers 1.5 cm. long. June, July.

← ← *Flowers small; hoods 2–3 mm. long, equaling the anthers; veins ascending.*

5. **A. incarnàta** L. (Swamp M.) Smooth or nearly so; the stem 5–10 dm. high, very leafy, with two downy lines above and on the branches of the peduncles; leaves oblong-lanceolate, acute or pointed, obtuse, obscurely heart-shaped or narrowed at base; flowers rose-purple (rarely whitish); hoods scarcely equaling

the slender needle-pointed horn. — Swamps, N. B., westw. and southw. July, Aug.

Var. **púlchra** (Ehrh.) Pers. Leaves broader and shorter-petioled, more or less hairy, as well as the stem; flowers paler. (*A. pulchra* Ehrh.) — N. S. to N. C. and Ga., rarely w. to Minn.

** * * Flowers greenish, yellowish, white, or merely purplish-tinged; leaves opposite or whorled, or the upper rarely scattered.*

+ Follicles echinate with soft spinous processes, densely tomentose (smooth, and only minutely echinate at the apex in no. 8), *large* (8–13 *cm. long*), *ovoid and acuminate, erect on deflexed pedicels; leaves large and broad, short-petioled; umbels terminal and lateral.*

6. **A. speciòsa** Torr. Finely canescent-tomentose or glabrate, *the many-flowered umbel and calyx densely tomentose; leaves subcordate-oval* to oblong; corolla-lobes purplish, ovate-oblong, 1 cm. long; hoods slightly longer, with a short inflexed horn, *the truncate summit abruptly produced into a very long lanceolate-ligulate appendage.* — Along streams, Minn. to Ark., and westw. June–Aug.

7. **A. syrìaca** L. (Common M. or Silkweed.) Stem tall and stout, finely soft-pubescent; *leaves* lanceolate to broadly oval, 1–2 dm. long, pale, *minutely downy beneath, as well as the peduncles*, etc.; corolla-lobes dull purple to white, 6–9 mm. long; *hoods* rather longer than the anthers, *ovate, obtuse, with a tooth each side of the short stout claw-like horn.* (*A. Cornuti* Dcne.) — Rich ground, N. B. to Sask., and southw. June–Aug. — Intermediates, perhaps of hybrid origin, occur between this and some of the related species.

8. **A. Sullivántii** Engelm. *Very smooth* throughout, tall; leaves ovate-oblong with a somewhat heart-shaped base, nearly sessile; *hoods obovate*, entire, *obtusely 2-eared at the base* outside; flowers larger (1.5–2 cm. long) and more purple than in the preceding; anther-wings 2-toothed at base; *pod* nearly glabrous, obscurely *spiny chiefly on the beak.* — Rich ground, s. Ont. and O. to Kan., Neb., and Minn. June, July.

+ + Follicles wholly unarmed, either glabrous or tomentulose-pubescent.

++ Follicles erect or ascending on the deflexed or decurved fruiting pedicels.

= Umbel solitary, on a naked terminal peduncle; leaves sessile, broad, transversely veined, wavy; glabrous and pale or glaucous.

9. **A. amplexicaúlis** Sm. Stem 3–8 dm. high; *leaves oblong, with a heart-shaped clasping base*, very obtuse or retuse, 4–12 cm. long; peduncle 3–20 cm. long; corolla pale greenish-purple; hoods truncate, somewhat toothed at the summit, shorter than the slender awl-pointed horn. (*A. obtusifolia* Michx.) — Sandy woods and fields, N. H. to Neb., and southw. June, July. — A second umbel at the base of the peduncle occasionally occurs.

10. **A. Meàdii** Torr. Stem slender, 4–6 dm. high; *leaves ovate or oblong-ovate*, obtuse or acutish, 3–7 cm. long; peduncle only twice the length of the upper leaves; pedicels rather short; corolla greenish-white; hoods rounded-truncate at summit, and with a sharp tooth at each margin, somewhat exceeding the stouter horn. — Dry ground, Wisc., Ill., and Ia. June.

= = Umbels mostly more than one; peduncle not overtopping the leaves.

a. Leaves large, orbicular to oblong-lanceolate; hoods broad, little if at all exceeding the anthers; glabrous or with some minute pubescence on young parts.

11. **A. phytolaccoìdes** Pursh. (Poke M.) Stem 5–15 dm. high; *leaves broadly ovate, or the upper oval-lanceolate and pointed at both ends, short-petioled*, smooth or slightly downy underneath, 1–3 dm. long; lateral umbels several; *pedicels loose and nodding, numerous*, slender, 2–5 cm. long, equaling the peduncle; *corolla-lobes* ovate-oblong, *greenish;* hoods (white) truncate, the margins 2-toothed at the summit, *the horn with a long projecting awl-shaped point.* (*A. exaltata* Muhl.? *nomen subnudum.*) — Moist copses, N. E. to Minn., s. to Ga. and Ark. June–Aug.

12. **A. variegàta** L. Stem 3–9 dm. high; *leaves* (4–5 pairs) *ovate, oval, or obovate*, somewhat wavy, *contracted into short petioles*, middle ones sometimes whorled; *pedicels (numerous and crowded) and peduncle short, downy;* divisions of the *corolla* ovate, *white;* hoods orbicular, entire, purplish or reddish, the horn semilunar with a horizontal point. — Dry woods, L. I. to Ind., s. to Fla., and w. La. May, June. — Remarkable for its compact umbels of nearly white flowers.

b. Leaves mostly pubescent or puberulent; hoods obtuse, entire, twice or thrice the length of the anthers.

13. **A. ovalifòlia** Dcne. Low, 1.5–6 dm. high, soft-downy especially the lower surface of the ovate or lanceolate-oblong acute short-petioled leaves (3.5–8 cm. long); umbels loosely 10–18-flowered, sessile or peduncled; pedicels slender; hoods oblong, yellowish, with a small horn, about the length of the oval greenish-white corolla-lobes (tinged with purple outside). — Prairies and oak openings, Ill. and Wisc. to S. Dak. and Man. June, July.

↔ ↔ Follicles and pedicels erect; leaves often whorled; glabrous or nearly so.

= Leaves ovate to broadly lanceolate, thin, rather slender-petioled.

14. **A. quadrifòlia** Jacq. Stem slender, 3–8 dm. high, mostly leafless below, bearing usually *one or two whorls* of four in the middle and one or two pairs *of ovate or ovate-lanceolate* taper-pointed petioled *leaves* (0.5–1 dm. long); pedicels slender; *corolla-lobes pale pink*, oblong; hoods white, elliptical-ovate, the incurved horn short and thick. — Dry woods and hills, N. H. to Ont. and Minn., s. to N. C. and Ark. May–July.

15. **A. perénnis** Walt. Stems 3–7 dm. high, *persistent or somewhat woody at the base; leaves lanceolate or lanceolate-ovate, tapering to both ends*, thin, rather slender-petioled; *flowers white*, small; the small hoods of the crown shorter than the needle-shaped horn; seeds sometimes destitute of a coma! — Low grounds, Ind. to Mo., Fla., and Tex. May–Aug.

= = Leaves narrowly linear to filiform; horn subulate, exserted; column conspicuous.

16. **A. verticillàta** L. *Stems* slender, simple or sparingly branched, 3–9 *dm. high, from a fibrous root*, very leafy to the summit; *leaves* linear, with revolute margins, 3–6 *in a whorl;* umbels small, lateral and terminal; divisions of the corolla ovate, greenish-white; hoods roundish-oval, about half the length of the incurved claw-shaped horns. — Prairies and open woods, Mass. to Sask., and southw.

17. **A. pùmila** (Gray) Vail. Similar; *low* (1–1.5 dm. high) *and many-stemmed from a woody caudex; leaves* much *crowded, spirally arranged*, filiform or filiform-linear. (*A. verticillata*, var. Gray.) — Dry plains, w. Ia. and Neb. to Col. and N. Mex.

§ 2. *Anther-wings broadly rounded at base and conspicuously auriculate-notched just above it; hoods with a minute horn exserted from the 2-lobed apex.*

18. **A. stenophýlla** Gray. Puberulent, but foliage glabrous; stems slender, 0.3–1 m. high; leaves narrowly linear, the upper alternate, lower opposite; umbels several, short-peduncled, 10–15-flowered; corolla-lobes oblong, greenish; hoods whitish, equaling the anthers, conduplicate-concave; follicles erect on ascending pedicels. (*Acerates angustifolia* Dcne.) — Dry prairies, Neb. to Mo., southw. and westw. June–Aug.

3. ACERÀTES Ell. Green Milkweed

Nearly like *Asclepias;* but the hoods destitute of crest or horn (whence the name, from α- privative, and κέρας, *a horn*). — Flowers greenish, in compact many-flowered umbels. Leaves opposite or irregularly alternate, short-petioled or sessile. Pollen-masses slender-stalked. Follicles not tuberculate.

* *Crown upon a column shorter than the globular mass of anthers and stigmas; leaves mainly alternate-scattered.*

1. A. auriculàta Engelm. Glabrous, or puberulent above, 1 m. or less high; *leaves narrowly linear or filiform*, 1 or 2 dm. long; umbels numerous, lateral, on peduncles about as long as the slender pubescent pedicels; *column very short and inconspicuous; hoods emarginate, appendaged below with a pair of broad auricles.* — Dry ground, Neb. and Kan., westw. and southw. June–Aug.

2. A. floridàna (Lam.) Hitchc. Minutely roughish-hairy or smoothish; *leaves linear to lanceolate;* umbels few, terminal or lateral, on peduncles of about the length of the slender pedicels; *column about 1 mm. long; hoods entire, not auricled.* (*A. longifolia* Ell.) — Prairies and pine barrens, O. to Ont., Minn., Tex., and Fla. June–Sept.

** *Crown sessile, the oblong hoods nearly equaling the anthers; leaves often opposite and broader.*

3. A. viridiflòra Ell. Minutely *soft-downy, becoming smoothish;* stems ascending, 3–8 dm. high; leaves oval to oblong, thick, 4–10 cm. long; *umbels nearly sessile, lateral*, dense and globose; flower (when the corolla is reflexed) 1 cm. long, short-pediceled. — Dry soil, Mass. to Sask., and southw. June–Sept. Var. LANCEOLÀTA (Ives) Gray. Leaves lanceolate, 6–10 cm. long. (Var. *Ivesii* Britton.) — Range of the typical form. Var. LINEÀRIS Gray. Leaves elongated, linear; stems low; umbels often solitary. — Man., N. Dak., and southw.

4. A. lanuginòsa (Nutt.) Dcne. *Hairy*, low (1–2.5 dm. high); leaves lanceolate or ovate-lanceolate; *umbel solitary and terminal, peduncled;* flowers smaller; *pedicels slender.* — Prairies, Ill. to Minn., and westw. July.

4. GONÓLOBUS Michx. ANGLE-POD

Crown of free leaflets, which are truncate or obscurely lobed at the apex, where they bear a pair of flexuous awns united at base. Anthers nearly as in *Asclepias;* pollen-masses oblong, obtuse at both ends, fixed below the summit of the stigma to the descending glands. Follicles elongate-ovoid to lanceolate, smooth. Seeds with a tuft, as in *Asclepias.* — A perennial twining herb, smooth, with opposite heart-ovate and pointed long-petioled leaves, and small whitish flowers in raceme-like clusters on slender axillary peduncles. (Name from γωνία, *an angle*, and λοβός, *a pod*, from the angled fruit.) ENSLENIA Nutt.

1. G. laèvis Michx. Climbing, 3–4 m. high; leaves 3.5–12 cm. wide. (*Enslenia albida* Nutt.; *Ampelanus albidus* Britton.) — River-banks and thickets, Pa. to Ill., Kan., and southw. July–Sept.

5. CYNÁNCHUM L.

Crown flat, simple. Anthers, smooth follicles, and seeds much as in *Asclepias.* — Herbs, often twining. (An ancient name for some plant supposed to be poisonous to dogs, from κύων, *dog*, and ἄγχειν, *to strangle.*) VINCETOXICUM Medic., Moench, etc., not Walt.

1. C. NIGRUM (L.) Pers. Twining, nearly smooth; leaves ovate or lance-ovate; *flowers* small, *dark purple*, in an axillary cluster, on a peduncle shorter than the leaves; *corolla pubescent within.* — Waste places and old fields, e. Mass. and Vt. to Pa. and O. June–Sept. (Introd. from Eu.)

2. C. VINCETÓXICUM (L.) Pers. Suberect, 3–6 dm. high; leaves ovate-lanceolate; *flowers greenish-white; corolla glabrous.* — Escaped from cultivation in s. Ont., near Niagara Falls (according to J. M. Macoun). (Introd. from Eu.)

6. VINCETÓXICUM Walt. ANGLE-POD

Corolla wheel-shaped, sometimes reflexed-spreading; the lobes convolute in the bud. Crown small, annular or cup-shaped, in the throat of the corolla. Anthers partly hidden under the flattened stigma, opening transversely. Pollen-

masses 5 pairs, horizontal. Follicles turgid, mostly muricate with soft warty projections, sometimes ribbed. Seed with a coma. — Herbs or shrubs with opposite heart-shaped leaves and corymbose-umbeled greenish or dark purple flowers on peduncles rising from between the petioles. Our species belong to the typical section, with the crown simple and unappendaged, and the corolla nearly veinless. (Name from *vincere*, to conquer, and *toxicum*, poison, applied originally to species of the preceding genus in allusion to supposed curative properties.) GONOLOBUS Michx., in part.

* *Crown a low undulately 10-lobed fleshy disk; follicles unarmed, glabrous, 3–5-costate or -angled.*

1. V. suberòsum (L.) Britton. Leaves cordate with an open shallow or sometimes deeper and narrow sinus, pointed, glabrate or hairy, 6–14 cm. long; umbels 3–9-flowered, much shorter than the petiole; *corolla broadly conical in bud, abruptly pointed, twisted; lobes ovate* or triangular-lanceolate, *acute, pubescent inside; calyx half as long.* (*Gonolobus* R. Br.) — Near the coast, Va. to Fla. June–Aug.

2. V. gonocárpos Walt. Leaves cordate with a deep and narrow often closed sinus, conspicuously acuminate, 0.5–1.5 dm. long, finely pubescent beneath; umbels 5–10-flowered, barely equaling the petiole; *corolla elongated-conical in bud, not twisted; lobes narrowly lanceolate, obtuse, glabrous inside, 3–4 times as long as the calyx.* (*Gonolobus laevis* Man. ed. 6, not Michx.) — River-banks, Va. to s. Ind., Mo., S. C., and Tex. June, July.

* * *Crown cup-shaped, as high as the anthers; follicles muricate, not costate.*

+ *Crown fleshy, merely 10-crenate, or the crenatures bidentate.*

3. V. obliquum (Jacq.) Britton. Leaves rounded- to ovate-cordate with a narrow sinus, abruptly acuminate, 0.7–2.5 dm. long; *umbel many-flowered; corolla in bud conical, its lobes linear-ligulate,* 1–1.5 cm. long, 2 mm. wide, crimson-purple inside, dull or greenish and *minutely pubescent outside.* (*Gonolobus* R. Br.) — River-banks, Pa. and Va. to O. and Mo. June, July.

4. V. hirsùtum (Michx.) Brittou. Commonly more hairy; leaves with the basal lobes sometimes overlapping; *peduncles fewer-flowered; corolla in bud ovoid, its lobes elliptical-oblong,* rarely 1 cm. long, *barely puberulent outside,* brownish-purple to yellowish (*Gonolobus* Michx.) — Md. and Va. to Tenn. and Fla. May–Aug.

+ + *Crown thinner, the border lobed or toothed; leaves as in the preceding.*

5. V. Shórtii (Gray) Britton. Resembles no. 3, but larger-leaved; corolla conical in bud, dark crimson-purple, its lobes ligulate, 1.5 cm. long; *crown about 10-toothed, the alternate teeth thinner, narrower and longer, either emarginate or 2-parted.* (*Gonolobus* Gray.) — Ky., and southw.

6. V. carolinénse (Jacq.) Britton. Flower-bud elongate-ovoid; corolla brownish-purple, its lobes oblong or linear-oblong, rarely 1 cm. long; *crown undulately and very obtusely 5-lobed, with a longer bifid subulate process in each sinus.* (*Gonolobus* R. Br.) — Va. to Mo., and southw. May–July.

7. V. Baldwiniànum (Sweet) Britton. Corolla whitish, with spreading oblong or spatulate lobes (at most 1 cm. long); *crown deeply cleft into 5 usually emarginate lobes half as long as the pair of subulate processes in each sinus.* (*Gonolobus* Sweet.) — Ga. to Mo. and Ark. May, June.

CONVOLVULÀCEAE (CONVOLVULUS FAMILY)

Chiefly twining or trailing herbs, often with some milky juice, with alternate leaves (or scales) and regular 5-androus flowers; a calyx of 5 imbricated sepals; a 5-plaited or 5-lobed corolla convolute or twisted in the bud (imbricate in no. 6); *a 2(rarely 3)-celled ovary (or in one tribe 2 separate pistils), with a pair of erect ovules in each cell, the cells sometimes doubled by a false partition between the seeds, so becoming 4-celled; the embryo large, curved or coiled in mucilagi-*

nous albumen. Fruit a globular 2–6-seeded capsule. Flowers mostly showy, on axillary peduncles; pedicels articulated, often 2-bracted. — Many are cultivated for ornament, and one, the Sweet Potato, for its edible farinaceous roots; those of several species are carthartic, *e.g.* Jalap.

Tribe I. DICHÓNDREAE. Carpels 2 or 4, distinct or nearly so; styles 2, basilar. Creeping herbs.
1. **Dichondra.** Corolla deeply 5-cleft. Pistils 2, one-seeded.

Tribe II. CONVOLVÙLEAE. Ovary entire. Leafy plants, mostly twiners.
2. **Breweria.** Style 2-cleft or 2-divided; the divisions simple; stigmas capitate.
3. **Evolvulus.** Styles 2, each 2-cleft; stigmas linear-filiform. Not twining.
4. **Ipomoea.** Style undivided, with stigma capitate or 2–3-globose.
5. **Convolvulus.** Style undivided or 2-cleft only at apex; stigmas 2, linear-filiform to subulate or ovate.

Tribe III. CUSCÙTEAE. Ovary entire. Leafless parasitic twining herbs, never green. Embryo filiform, coiled, without cotyledons.
6. **Cuscuta.** The only genus of the group.

1. DICHÓNDRA Forst.

Calyx 5-parted. Corolla broadly bell-shaped. Stamens included. Styles, ovaries, and utricular 1–2-seeded capsules 2, distinct. Stigmas thick. — Small and creeping perennial herbs, soft-pubescent, with kidney-shaped entire leaves, and axillary 1-flowered bractless peduncles. Corolla small, yellowish or white. (Name from *δίς, double,* and *χόνδρος, a grain,* from the fruit.)

1. **D. rèpens** Forst. Leaves round-kidney-shaped, pubescent, green both sides; corolla not exceeding the calyx. (*D. evolvulacea* Britton.) — Wet ground, Va. to Tex., near the coast.

2. BREWÈRIA R. Br.

Styles 2, or rarely 3, simple and distinct, or else united into one below; stigmas depressed-capitate. Otherwise as *Convolvulus* and *Evolvulus.* — Perennial prostrate or diffusely spreading herbs; flowers small, in summer; corolla more or less hairy or silky outside. (Named for *Samuel Brewer,* an English botanist or amateur of the 18th century.)

1. **B. humistràta** (Walt.) Gray. *Sparsely hairy* or nearly smooth; leaves varying from oblong with a somewhat heart-shaped base to linear, mucronate or emarginate; peduncles 1–7-flowered; bracts shorter than the pedicels; *sepals pointed, glabrous* or nearly so; *corolla white; filaments hairy; styles united at base.* — Dry pine barrens, Va. to La.

2. **B. aquática** (Walt.) Gray. *Minutely soft-downy* and somewhat hoary; peduncles 1–3-flowered; *sepals silky; corolla pink or purple; filaments smooth: styles almost distinct;* otherwise nearly as no. 1. — Wet pine barrens and margins of ponds, N. C. to Tex., extending into Mo.

3. **B. Pickeríngii** (M. A. Curtis) Gray. Soft-pubescent or smoothish; *leaves very narrowly linear* or the lowest linear-spatulate, tapering to the base, nearly sessile; peduncles 1–3-flowered; *bracts resembling the leaves,* mostly exceeding the flowers; *sepals hairy; filaments* (scarcely hairy) *and styles* (*united far above the middle*) *exserted from the open white corolla.* — Dry pine barrens and prairies, N. J., and southw.; also Ill., Ia., and southw.

3. EVÓLVULUS L.

Calyx of 5 sepals, naked at base. Corolla open-funnel-form or almost rotate. Styles 2, each 2-cleft; stigmas obtuse. Capsule 2-celled; the cells 2-seeded. — Low and small herbs or suffrutescent plants, mostly diffuse, never twining (hence the name, from *evolvere,* to unroll, in contrast with *Convolvulus*).

1. **E. argénteus** Pursh. Many-stemmed from a somewhat woody base, dwarf, silky-villous all over; leaves crowded, broadly lanceolate, sessile, or the lower

oblong-spatulate and short-petioled; flowers almost sessile in the axils; corolla purple, about 1 cm. broad. (*E. pilosus* Nutt.) — Sterile plains and prairies, N. Dak. and Neb. to Mo. and Tex. May–July.

4. IPOMOÈA L. Morning Glory

Calyx not bracteate at base, but the outer sepals commonly larger. Corolla salver-form or funnel-form to nearly campanulate; the limb entire or slightly lobed. Capsule globular, 4–6(by abortion fewer)-seeded, 2–4-valved. (Name, according to Linnaeus, from ἴψ, *a Bindweed*, and ὅμοιος, *like;* but ἴψ is *a worm.*)

§ 1. QUÁMOCLIT [Tourn.] Gray. *Corolla salver-form, or with somewhat funnel-form but slender tube; stamens and style exserted; flowers red; annual twiners.*

1. I. Quámoclit L. (Cypress Vine.) Leaves pinnately parted into linear-thread-shaped parallel lobes; peduncles 1–2-flowered; corolla slender, 3.5–4 cm. long, scarlet-red, or sometimes white. (*Quamoclit* Britton.) — Sparingly spontaneous, especially southw. July–Oct. (Introd. from Trop. Am.)

2. I. coccínea L. Leaves heart-shaped, acuminate, entire or angled; peduncles 2–several-flowered; sepals awn-pointed; corolla light scarlet, 2–3 cm. long. (*Quamoclit* Moench.) — River-banks and waste places, N. Y. to Mo., and southw. July–Oct. (Indigenous southwestw.) Var. hederifòlia (L.) Gray. Leaves deeply palmate-lobed. — River-flats, waste land, etc., from Mass. westw. and southw. (Adv. from Trop. Am.)

§ 2. EUIPOMOÈA Gray. *Corolla funnel-form or nearly campanulate, contorted in the bud; stamens and style not exserted.*

* *Lobes of stigma and cells 3, sepals long and narrow, attenuate upward, mostly hirsute below; corolla purple, blue, or white.* (Morning Glory.)

3. I. hederàcea Jacq. Stems retrorsely hairy; *leaves heart-shaped, 3-lobed,* the lobes acute or acuminate; peduncles short or rather long, 1–3-flowered; calyx densely hairy below; corolla white and purple or pale blue, 3–4.5 cm. long. — Waste and cultivated ground, from s. Me. westw. and southw. July-Sept. (Introd. from Trop. Am.)

4. I. purpùrea (L.) Roth. (Common M.) Annual; stems retrorsely hairy; *leaves heart-shaped, acuminate, entire;* peduncles long, umbellately 3–5-flowered; calyx bristly-hairy below; corolla funnel-form, 4.5–7 cm. long, purple, varying to white. — Escaped in cultivated grounds. (Introd. from Trop. Am.)

** *Stigma 2-lobed or entire; cells 2, each 2-seeded; sepals broader, imbricated; leaves cordate, acuminate.*

5. I. panduràta (L.) G. F. W. Mey. (Wild Potato-vine, Man-of-the-Earth.) Perennial, smooth or nearly so when old, trailing or sometimes twining; leaves occasionally contracted at the sides so as to be fiddle-shaped; *peduncles longer than the petioles,* 1–5-flowered; *sepals smooth, ovate-oblong, very obtuse;* corolla open-funnel-form, 4.5–8 cm. long, white, with purple in the tube. — Dry ground, Ct. to Ont., southw. and southwestw. June–Sept.— Stems long and stout, from a huge root, which often weighs 4–8 (–11) kg.

6. I. lacunòsa L. Annual; rather smooth; stem twining and creeping, slender; leaves entire or angle-lobed; *peduncles short,* 1–3-flowered; *sepals lance-oblong, pointed, bristly-ciliate* or hairy, half the length of the sharply 5-lobed (white, 1–2 cm. long) corolla. — River-banks and low grounds, Pa. to Ill., Kan., and southw.; adv. on ballast northw.

5. CONVÓLVULUS [Tourn.] L. Bindweed

Corolla funnel-form to campanulate. Stamens included. Capsule globose, 2-celled, or imperfectly 4-celled by spurious partitions between the 2 seeds, or by abortion 1-celled, mostly 2–4-valved. — Herbs or somewhat shrubby plants, twining, erect, or prostrate. (Name from *convolvere,* to entwine.)

§ 1. CALYSTÈGIA (R. Br.) Gray. *Stigmas oval to oblong; calyx inclosed in 2 broad leafy bracts.*

* *Erect; petioles at most one fourth as long as the leaf-blades.*

1. C. spithamaèus L. *Downy; stem low and mostly simple, upright or ascending*, 1.5–3 dm. long; leaves broadly oblong, with or without a heart-shaped or auricled base; corolla white, 4–5 cm. long; stigmas oval. — Dry and sandy or rocky soil, local. May–Aug.

** *Twining or trailing; petioles longer.*

← *Flowers double.*

2. C. JAPÓNICUS Thunb. *Pubescent;* leaves narrowly hastate; *flowers* usually *double*, pink. — Waste places, etc., escaped from cultivation. (Introd. from Asia.)

← ← *Flowers single.*

3. C. sèpium L. (HEDGE B.) *Glabrous or essentially so;* stem *high-twining or sometimes trailing extensively; leaves triangular-halberd-shaped*, acute or pointed, the basal lobes obliquely truncate and often somewhat toothed or sinuate-lobed or merely rounded; *peduncles* chiefly *elongated*, 4-angled; bracts rounded to sharp-acuminate at tip; corolla white or rose-color, 3–5 cm. long (Including var. *americanus* Sims.) — Moist alluvial soil or along streams. June–Sept. (Eurasia.) Passing freely to

Var. pubéscens (Gray) Fernald. More or less *pubescent; stems trailing or sprawling*, 3–7 dm. long; *leaves oblong-ovate, cordate*, the basal lobes obtuse or rounded and entire. (Var. *repens* Gray; *C. repens* L.) — Gravelly or marshy sea-coast, e. Que. to Fla.; rare about the Great Lakes.

Var. fraterniflòrus Mackenzie & Bush. More or less *pubescent; leaves hastate;* flowers 1 or 2 in the axils, their *peduncles* mostly *short* and wing-angled. — D. C. to Mo., and southw.

§ 2. STROPHOCAÚLOS G. Don. *Stigmas filiform; no bracts at or near the base of the calyx.*

4. C. ARVÉNSIS L. (FIELD B.) Perennial; stem procumbent or twining, and low; leaves ovate-oblong, arrow- or halberd-shaped, with the lobes at the base acute; peduncles mostly 1-flowered; bracts minute, remote; corolla 1.5–2 cm. long, white or tinged with red. — Old fields and in waste places. June–Aug. (Nat. from Eu.) Var. OBTUSIFÒLIUS Choisy. Basal lobes of the leaves rounded. — Less common. (Adv. from Eu.)

6. CÚSCUTA [Tourn.] L. DODDER. LOVE VINE

Calyx 5(rarely 4)-cleft, or of 5 sepals. Corolla globular-urn-shaped, bell-shaped, or short-tubular, the spreading border 5(rarely 4)-cleft, imbricate. Stamens with a scale-like often fringed appendage at base. Ovary 2-celled, 4-ovuled; styles distinct, or rarely united. Capsule mostly 4-seeded. Embryo spirally coiled in the rather fleshy albumen, sometimes with a few alternate scales (belonging to the plumule); germination occurring in the soil. — Leafless annual herbs, with thread-like yellowish or reddish stems, bearing a few minute scales in place of leaves; on rising from the ground becoming entirely parasitic on the bark of herbs and shrubs on which they twine, and to which they adhere by means of suckers developed on the surface in contact. Flowers small, cymose-clustered, mostly white, usually produced in summer and autumn. (Name supposed to be of Arabic derivation.)

§ 1. *Stigmas elongated; capsule circumscissile.*

* *Styles longer than the ovary and capsule.*

1. C. EPÍLINUM Weihe. (FLAX D.) Stems very slender, low; *flowers yellowish, globular*, sessile in dense scattered heads; corolla 5-parted, short-cylindrical, scarcely exceeding the broadly ovate acute divisions of the calyx,

persistent around the capsule; *stamens included;* scales short, broad, crenulate, shorter than the globose ovary. — Flax-fields; in Europe very injurious; sparingly introduced with flax-seed into the Northern States. June–Aug. (Introd. from Eu.)

2. C. Epíthymum Murr. Stems very slender; *flowers whitish or pinkish,* capitate; corolla-lobes spreading, the *cylindrical* tube longer than the subcrect acute sepals; scales large, contiguous, toothed; *stamens exserted.* (*C. Trifolii* Bab.) — Occasionally found on clover, etc. July, Aug. (Introd. from Eu.)

** * Styles shorter than the ovary and capsule.*

3. C. europaèa L. Slender; flowers subglobose, in dense globular clusters; corolla 4–5-parted, the lobes obtuse; scales truncate or bifid, very small and thin or seemingly obsolete; calyx with obtuse lobes; capsule comparatively large, often loosely capped by the old corolla. — On *Solidago, Viburnum, etc.,* in a hedge-row, Gilead, Me. (*Miss Furbish*). July, Aug. (Adv. from Eu.)

§ 2. *Stigmas capitate; capsule indehiscent.*

** Calyx gamosepalous; ovary and capsule depressed-globose.*

← Flowers in dense or globular clusters; corolla with short and wide tube, persistent at the base of the capsule; styles mostly shorter than the ovary.

4. C. obtusiflòra HBK. *Stems coarse, orange-colored;* flowers white, 2–3 mm. long; lobes of calyx oblong, obtuse, of corolla obtuse or acutish, often longer than the tube; *scales small, 2-cleft,* often reduced to a few teeth; the thin capsule pale greenish-yellow. (*C. chlorocarpa* and *C. Polygonorum* Engelm.) — Wet places, Del. and Pa. to Minn., and southw.; often on *Polygonum.* July–Sept. (Trop. Am., Eurasia.)

5. C. arvénsis Beyrich. *Stems pale and slender,* low; *flowers smaller* (1.5–2 mm. long); calyx-lobes (5) obtuse, mostly very broad; lobes of the corolla acuminate, longer than the tube, with inflexed points; *scales large, deeply fringed.* — Rather dry soil, on various low plants, Mass., westw. and southw. July–Oct.

← ← Flowers in panicled often densely compound cymes; styles slender, mostly longer than the ovary; corolla withering on the summit of the large capsule.

6. C. Cephalánthi Engelm. Stem coarse and yellow, usually rather high-climbing; flowers 2 mm. long, on short thick pedicels, often 4-merous; lobes of calyx and corolla oblong, obtuse, the latter mostly shorter than the slender deeply campanulate tube; scales shorter than the tube, fringed. (*C. tenuiflora* Engelm.) — On tall herbs and shrubs, Pa. to Minn., and southw. July, Aug.

** * Calyx gamosepalous; ovary and capsule pointed, the latter enveloped or capped by the marcescent corolla; flowers in loose panicled cymes.*

← Acute tips of the corolla-lobes inflexed.

7. C. indecòra Chois. Stems coarse; flowers fleshy and more or less papillose, 3–5 mm. long; calyx-lobes triangular, acute or acutish; lobes of the broadly campanulate corolla ovate-lanceolate, minutely crenulate, *spreading; scales large, deeply fringed; capsule enveloped by remains of corolla;* anthers and stigmas yellow or deep purple. (*C. decora* Engelm.) — Wet prairies, on herbs and low shrubs (principally *Leguminosae* and *Compositae*), from Ill. to Fla., Tex., and westw. June–Sept. (Trop. Am.)

8. C. Córyli Engelm. Similar to the preceding; *flowers* of the same structure, but *smaller* (2 mm. long), generally 4-merous; *corolla* deeper, *with erect lobes, finally capping the capsule; scales reduced to a few teeth.* (*C. inflexa* Engelm.) — Open woods and dry prairies, on shrubs (hazels, etc.) or coarse herbs, Ct. (according to Britton); Va. to Minn., Neb., and southw.

← ← Corolla-lobes obtuse, spreading.

9. C. Gronòvii Willd. Stems coarse, often climbing high; corolla-lobes shorter than or equaling the deeply campanulate tube; scales copiously fringed; *capsule globose, umbonate.* — Wet shady places, N. S. to Man., and southw. —

The commonest of our species. Very variable in size and compactness of clusters.

10. **C. rostràta** Shuttlw. Similar to the preceding; flowers larger (4–6 mm. long), more delicate and whiter; lobes of corolla and calyx shorter than the tubes; slender styles longer; *ovary bottle-shaped; capsule long-pointed.* — Shady valleys in the mts., Md. and Va., southw.; on tall herbs, rarely shrubs.

*** *Sepals 5, distinct, surrounded by 2 or more similar bracts; styles capillary; scales large, deeply fringed, capsule capped by the marcescent corolla.*

11. **C. cuspidàta** Engelm. Stems slender; *flowers* 3–5 mm. long, thin, *on bracteolate pedicels in loose panicles;* the ovate-orbicular bracts and sepals and the oblong corolla-lobes cuspidate or mucronate, rarely obtuse, shorter than the cylindrical tube; styles many times longer than the ovary, at length exserted.— Wet or dry prairies, on *Ambrosia*, *Iva*, some *Leguminosae*, etc., Neb. to Mo. and Tex.

12. **C. compácta** Juss. Stems coarse; *flowers closely sessile in densely compact clusters; bracts* (3–5) *and sepals orbicular, concave, slightly crenate, appressed*, nearly equaling or much shorter than the cylindrical tube of the corolla; stamens shorter than the oblong obtuse spreading lobes of the latter. — In damp woods, almost always on shrubs, Mass. to Ont., and southw.

13. **C. glomeràta** Chois. *Flowers very densely clustered*, forming knotty masses closely encircling the stem of the foster plant, much imbricated with scarious oblong *bracts, their tips recurved-spreading; sepals nearly similar*, shorter than the short-cylindrical tube of the corolla; stamens nearly as long as the oblong-lanceolate obtuse spreading or reflexed corolla-lobes; style several times longer than the ovary. (*C. paradoxa* Raf.?) — Wet prairies, O. to Minn., Kan., and Tex., mostly on tall *Compositae*. — The rope-like twists (1–3 cm. thick) of white flowers, with golden yellow anthers imbedded in a mass of curly bracts, have a singular appearance.

POLEMONIÀCEAE (Polemonium Family)

Herbs, with alternate or opposite leaves, regular 5-merous and 5-androus flowers, the lobes of the corolla convolute in the bud, a 3-celled ovary and 3-lobed style; capsule 3-celled, 3-valved, loculicidal, few–many-seeded; the valves usually breaking away from the triangular central column. Seeds amphitropous, the coat frequently mucilaginous when moistened and emitting spiral threads. Embryo straight, in the axis of copious albumen. Calyx persistent, imbricated. Corolla with a 5-parted border. Anthers introrse. — Insipid and innocent plants, many ornamental and in cultivation.

1. **Phlox.** Corolla salver-form. Calyx slender. Leaves opposite, entire.
2. **Gilia.** Corolla tubular-funnel-form or salver-form. Calyx slender, partly scarious. Leaves mostly alternate.
3. **Polemonium.** Corolla open-bell-shaped. Calyx herbaceous, bell-shaped. Filaments slender, equal. Leaves alternate, pinnate or pinnately parted.

1. PHLÓX L.

Calyx somewhat prismatic, or plaited and angled. Corolla with a long tube. Stamens very unequally inserted in the tube of the corolla, included. Capsule ovoid, with sometimes 2 ovules but ripening only a single seed in each cell. — Perennials (except a few southern species), with opposite and sessile perfectly entire leaves, the floral often alternate. Flowers cymose, mostly bracted; the open clusters terminal or crowded in the upper axils. (Φλόξ, *flame*, an ancient name of *Lychnis*, transferred to this North American genus.) Most of our species are cultivated in gardens.

§ 1. *Herbaceous, with flat (broad or narrow) leaves.*

* *Stem strictly erect; panicle pyramidal or ellipsoid, many-flowered; peduncles and pedicels very short; corolla-lobes entire.*

1. **P. paniculàta** L. Stem stout, 0.5–1.5 m. high, smooth, or puberulent or villous above; leaves oblong-lanceolate and ovate-lanceolate, pointed, large, tapering or rounded, the upper often heart-shaped at the base; *panicle ample, pyramidal-corymbed*; calyx smooth or glandular-hispid, the *teeth awn-pointed*; corolla pink-purple varying to white. (Including *P. acuminata* Pursh, *P. glandulosa* Shuttlw., and *P. amplifolia* Britton.) — Open woods, Pa. to Ill., Kan., and southw.; escaped from cultivation northw. July–Sept. — Highly variable in outline of leaf, pubescence of leaves, stems, calyx, and corolla, but without concomitant characters.

2. **P. maculàta** L. (Wild Sweet William.) Smooth, or barely roughish; *stem spotted with purple*, rather slender, 3–9 dm. high; lower leaves lanceolate, the upper nearly ovate-lanceolate, tapering to the apex from the broad and rounded or somewhat heart-shaped base; *panicle narrow, ellipsoid*, leafy below; *calyx-teeth triangular-lanceolate, short, scarcely pointed*; corolla pink-purple. — Rich woodlands and along streams, Ct. to Minn., and southw. June–Sept. Var. cándida Michx. White-flowered; commonly with spotless stem. — With the ordinary form.

** *Stems, at least the flowering ones, ascending or erect; flowers in corymbed or simple cymes; corolla-lobes obovate or obcordate.*

+ *Calyx-teeth triangular-subulate; corolla-lobes rounded, entire; glabrous or nearly so.*

3. **P. ovàta** L. Stems ascending, 2.5–6 dm. high, often from a prostrate base; *leaves oblong-lanceolate, or the upper ovate-lanceolate*, and sometimes heart-shaped at the base, acute or pointed; flowers pink or rose-red, crowded, short-peduncled; *calyx-teeth* short and broad, *acute*. — Woods, Pa. to Ala. May–July.

4. **P. glabérrima** L. Stems slender, erect, 0.3–1 m. high; *leaves linear-lanceolate or rarely oblong-lanceolate*, very smooth (except the rough and sometimes revolute margins), 5–12 cm. long, tapering gradually to a point; cymes few-flowered and loosely corymbed; flowers peduncled, pink or whitish; *calyx-teeth* narrower and very *sharp-pointed*. — Prairies and open woods, n. Va. to O. and Minn., s. to Fla. and Mo. June, July.

+ + *Calyx-teeth long and slender; more or less hairy or glandular-pubescent.*

++ *No runners or prostrate leafy shoots.*

5. **P. pilòsa** L. Stems slender, nearly erect, 2–5 dm. high, usually hairy, as are the *lanceolate or linear leaves* (2.5–10 dm. long), which commonly *taper to a sharp point*; cymes at length open; *calyx-teeth slender, awl-shaped and awn-like*, longer than the tube, loose or spreading, lobes of the pink-purple or rose-red (rarely white) corolla obovate, entire. — Dry or sandy woods, prairies, etc., Ct. to Ont., Man., and southw. May, June.

6. **P. amoèna** Sims. Stems ascending, 1.5–5 dm. high, mostly simple; *leaves broadly linear, lanceolate, or ovate-oblong*, abruptly acute or blunt, 2–5 cm. long, on sterile shoots often ovate; *cyme mostly compact and sessile, leafy-bracted; calyx-teeth awl-shaped or linear*, sharp-pointed, but seldom awned, rather longer than the tube, straight; lobes of the corolla obovate and entire (or rarely notched), purple, pink, or sometimes white. — Dry hills and barrens, Va. to Ky., s. to Fla. May, June.

++ ++ *Leafy shoots from the base creeping or decumbent; leaves rather broad.*

7. **P. stolonífera** Sims. *Runners creeping, bearing roundish-obovate* smoothish and thickish *leaves*; flowering stems (1–2.5 dm. high) and their *oblong or ovate obtuse leaves* (1–2.5 cm. long) *pubescent*, often clammy; cyme close, few-flowered; calyx-teeth linear-awl-shaped, about the length of the tube; *lobes of the reddish-purple corolla round-obovate, mostly entire.* (*P. reptans* Michx.) —

Damp woods, in the Allegheny region, Pa. to Ky. and Ga.; locally introd. northw. May, June.

8. P. divaricàta L. (Blue Phlox.) Stems spreading or ascending from a decumbent base, 2–5 dm. high; *leaves oblong- or lance-ovate* or the lower oblong-lanceolate, 2–5 cm. long, acutish; cyme corymbose-panicled, spreading, loosely flowered; calyx-teeth slender awl-shaped, longer than the tube; *lobes of the pale lilac or bluish corolla obcordate or wedge-obovate and notched* at the end, or *often entire*, equaling or longer than the tube, with rather wide sinuses between them. — Rocky damp woods, w. Que. to Minn., and southw. May, June — A form occurs near Crawfordsville, Ind., with reduced flowers, the narrow entire acuminate corolla-lobes scarcely half as long as the tube.

* * * *Stems low, diffuse and branching; flowers scattered or barely cymulose; corolla-lobes narrowly cuneate, bifid; calyx-lobes subulate-lanceolate.*

9. P. bífida Beck. *Minutely pubescent;* stems ascending, branched, 1–2 dm. high; leaves linear, becoming nearly glabrous, 1–4.5 cm. long, 2–3 mm. wide; flowers few, on slender peduncles; calyx-teeth awl-shaped, about as long as the tube; *lobes of the pale purple corolla 2-cleft to or below the middle*, equaling the tube, the *divisions linear-oblong.* — Sandy soil, Ind. to Mich., Ia., and Mo May, June.

10. P. Stellària Gray. *Very glabrous;* leaves barely somewhat ciliate at base, linear, 1.5–5.5 cm. long, 1–3.5 mm. wide, acute, rather rigid; flowers mostly long-peduncled; *lobes of the pale blue or almost white corolla bifid at the apex into barely oblong lobes.* — Limestone cliffs of Ky. R., s. Ill., and barrens of Tenn. Apr., May.

§ 2. *Suffruticulose and creeping-cespitose, evergreen, with mostly crowded and fascicled subulate and rigid leaves.*

11. P. subulàta L. (Ground or Moss Pink.) Depressed, in broad mats; stems villous above, or somewhat glandular; leaves awl-shaped, lanceolate, or narrowly linear, 0.5–1.5 cm. long; cymes few-flowered; calyx-teeth awl-shaped, rigid; corolla pink-purple or rose-color with a darker center, sometimes white; lobes wedge-shaped, notched, or entire. (*P. Hentzii* Nutt. = *P. Brittonii* Small, the most glandular state.) — Dry rocky hills and sandy banks, N. Y. to Mich., Ky., and Fla.; naturalized in N. E. Apr.–June.

2. GÍLIA R. & P.

Calyx-lobes narrow and acute, the tube scarious below the sinuses. Stamens equally or unequally inserted. Capsule with solitary to numerous seeds. — Mostly herbs with alternate leaves. (Dedicated to *Felipe Gil*, a Spanish botanist.)

§ 1. COLLÒMIA (Nutt.) Gray. *Flowers capitate-glomerate and foliose-bracted; stamens unequally inserted in the narrow tube of the salver-form corolla; ovules solitary; leaves sessile and entire; annuals.*

1. G. lineàris (Nutt.) Gray. Branching and in age spreading, 1.5–5 dm. high; leaves linear- or oblong-lanceolate; calyx-lobes triangular-lanceolate, acute; corolla 1 cm. long, from lilac-purple to nearly white, very slender, with small limb. (*Collomia* Nutt.) — Dry open soil, n. e. N. B. and adjacent Que.; Minn. and Man. to B. C., s. to Ariz. and Cal.; slightly adv. eastw.

§ 2. IPOMÓPSIS (Michx.) Benth. *Flowers in long thyrsoid panicles; stamens equally inserted at or below the throat of the narrow funnel-form corolla; ovules many; leaves mostly divided; biennials.*

2. G. rùbra (L.) Heller. (Standing Cypress.) Simple, 0.5–1 m. high; *leaves crowded, divided into filiform segments;* thyrse 2–4 dm. long; calyx with long setaceous lobes; *corolla red, pink, or white*, 2.5–3.5 *cm. long;* stamens included or barely exserted. (*G. coronopifolia* Pers.) — Pastures and roadsides, local, Franklin Co., Mass., and O. June–Aug. (Nat. from the Southwest.)

3. POLEMÒNIUM [Tourn.] L. Greek Valerian

Stamens equally inserted at the summit of the very short tube of the open-bell-shaped or short funnel-form corolla; filaments declined, hairy-appendaged at the base. Capsule few–several-seeded. — Perennials, with alternate pinnate leaves, the upper leaflets sometimes confluent; the corymbose flowers nearly bractless. (An ancient name, from πόλεμος, *war*, of doubtful application.)

1. P. réptans L. Smooth throughout or slightly pubescent; *stems weak and spreading*, 2–4 dm. high, never creeping as the name denotes; leaflets 5–15, ovate-lanceolate or oblong; corymbs few-flowered; flowers nodding; calyx-lobes ovate, shorter than the tube; *stamens and style included; corolla* light blue, about 1–1.5 *cm. wide; capsules about* 3-*seeded.* — Woods, N. Y. to Minn., and southw. Apr.–June.

2. P. Van-Brúntiae Britton. *Stem erect*, 1 m. or less high, nearly or quite glabrous; leaflets 9–21, ovate to lanceolate, or the upper leaves rarely simple; flowers in close cymes forming a thyrse or contracted panicle; calyx enlarged in fruit, becoming 1 cm. or more long, the acutish lobes about equaling the tube; *stamens and style exserted; corolla* blue, 1.5–2 *cm. broad; capsule several-seeded.* (*P. coeruleum* Man. ed. 6, not L.) — Mountain swamps, Vt., n. w. Ct., and N. Y. to Md. May–July.

HYDROPHYLLÀCEAE (Waterleaf Family)

Herbs, commonly hairy, with mostly alternate leaves, regular 5-*merous and* 5-*androus flowers, in aspect between the foregoing and the next family; but the ovary entire and* 1-*celled with* 2 *parietal* 4-*many-ovuled placentae, or rarely* 2-*celled by the union of the placentae in the axis; style* 2-*cleft, or* 2 *separate styles; fruit a* 2-*valved* 4-*many-seeded capsule.* Seeds mostly reticulated or pitted. Embryo small, in copious albumen. Flowers chiefly blue or white, in 1-sided cymes or false racemes, which are mostly bractless and coiled from the apex when young, as in the Borage Family. — A small family of plants of no marked properties; some cultivated for ornament.

Tribe I. HYDROPHÝLLEAE. Ovary and capsule 1-celled. Seeds pitted or reticulated; albumen cartilaginous. Leaves cut-toothed, lobed, or pinnate. Style 2-cleft.

* Ovary lined with the dilated and fleshy placentae, which inclose the ovules and seeds (in our plants only 4) like an inner pericarp.

1. **Hydrophyllum.** Stamens exserted; anthers linear. Calyx unchanged in fruit.
2. **Nemophila.** Stamens included; anthers ovoid or cordate. Calyx with reflexed appendages at the sinuses, enlarged in fruit.
3. **Ellisia.** Stamens included. Calyx destitute of appendages, enlarged in fruit.

* * Ovary with narrow parietal placentae, in fruit projecting inward more or less.

4. **Phacelia.** Corolla-lobes imbricated in the bud. Calyx destitute of appendages.

Tribe II. HYDRÒLEAE. Ovary and capsule 2-celled, the placentae often projecting from the axis far into the cells. Albumen fleshy. Leaves entire. Styles 2.

5. **Hydrolea.** Corolla between wheel-shaped and bell-shaped.

1. HYDROPHÝLLUM [Tourn.] L. Waterleaf

Calyx 5-parted, sometimes with a small appendage in each sinus, early open in the bud. Corolla bell-shaped, 5-cleft; the lobes convolute in the bud; the tube furnished with 5 longitudinal linear appendages opposite the lobes, forming a nectariferous groove. Stamens and style mostly exserted; filaments more or less bearded. Ovary bristly-hairy (as is usual in the family); the placentae soon free from the walls except at the top and bottom. Capsule ripening 1–4 seeds, spherical. — Perennials, with petioled ample leaves, and white or bluish-purple

cymose-clustered flowers. (Name formed of ὕδωρ, *water*, and φύλλον, *leaf;* of no obvious application.)

* *Calyx with minute if any appendages; rootstocks creeping, scaly-toothed.*

1. **H. macrophýllum** Nutt. *Rough-hairy; leaves oblong, pinnate and pinnatifid; the divisions* 9–13, *ovate, obtuse*, coarsely cut-toothed; basal leaves 2–3.5 dm. long; *peduncle shorter than the petiole;* calyx-lobes lanceolate-pointed from a broad base, very hairy; flowers 1 cm. or so long, crowded in a globular cluster; anthers short-oblong. — Rich woods, Va. to O., Ill., and southw. May, June.

2. **H. virginiànum** L. *Smoothish*, 2–7 dm. high; *leaves pinnately divided; the divisions* 5–7, *ovate-lanceolate or oblong, pointed*, sharply cut-toothed, the lowest mostly 2-parted, the uppermost confluent; *peduncles longer than the petioles* of the upper leaves, forked; calyx-lobes narrowly linear, bristly-ciliate; flowers 1 cm. or less long; anthers oblong-linear. — Rich woods, N. H. and w. Que., westw. and southw. May–Aug. — *H. patens* Britton, indistinguishable as to foliage, is said to differ in its somewhat more ciliate petioles, appressed calyx-lobes, and more spreading corolla-lobes.

3. **H. canadénse** L. *Nearly smooth*, 2–7 dm. high; *leaves* 0.5–2.5 dm. broad, *palmately 5–7-lobed, rounded*, heart-shaped at base, unequally toothed, those from the base sometimes with 2–3 small and scattered lateral leaflets; *peduncles mostly shorter than the petioles*, forked, the nearly white flowers on very short pedicels; calyx-lobes linear-awl-shaped, nearly smooth, often with minute teeth in the sinuses. — Damp rich woods, s. w. Vt. and w. Mass. to Ont., Ill., Ky., and N. C. June–Aug.

** *Calyx with a small reflexed lobe in each sinus; stamens little exserted.*

4. **H. appendiculàtum** Michx. Hairy; stem-leaves palmately 5-lobed, rounded, the lobes toothed and pointed, the lowest pinnately divided; cymes rather loosely flowered; filiform pedicels and calyx bristly-hairy. — Damp woods, N. Y. and Ont. to Minn., and southw. May, June.

2 NEMÓPHILA Nutt.

Corolla bell-shaped or almost wheel-shaped; lobes convolute in the bud; tube mostly with 10 small folds or scales inside. Placentae (bearing each 2–12 ovules), capsule, and seeds as in *Hydrophyllum.* — Diffuse fragile annuals, with opposite or partly alternate pinnatifid or lobed leaves, and 1-flowered peduncles. (Name from νέμος, *a grove*, and φιλεῖν, *to love.*)

1. **N. micrócalyx** (Nutt.) Fisch. & Mey. Small, roughish-pubescent; stems diffusely spreading, 0.5–4 dm. long; leaves parted or deeply cleft into 3–5 roundish or wedge-obovate sparingly cut-lobed divisions, the upper all alternate; peduncles opposite the leaves, shorter than the long petioles; flowers minute; corolla white, longer than the calyx; placentae each 2-ovuled; capsule 1–2-seeded. — Moist woods, Va. to Fla., w. to Ark. and Tex. Apr.–June.

3. ELLÍSIA L.

Corolla bell-shaped or cylindraceous, not longer than the calyx, 5-lobed above, the lobes imbricated or convolute in the bud, the tube with 5 minute appendages within. Placentae (each 2-ovuled), fruit, and seeds much as in *Hydrophyllum.* — Delicate and branching annuals, with lobed or divided leaves, the lower opposite, and small whitish flowers. (Named for *John Ellis*, distinguished naturalist and correspondent of Linnaeus.) MACROCALYX Trew.

1. **E. Nyctèlea** L. Minutely or sparingly roughish-hairy, divergently branched, 1–4 dm. high; leaves pinnately parted into 7–13 lanceolate or linear-oblong sparingly cut-toothed divisions; peduncles solitary in the forks or opposite the leaves, 1-flowered; calyx-lobes lanceolate, pointed, about the length of the cylindraceous corolla, in fruit ovate-lanceolate, 1 cm. long; capsule pendulous. — Shady damp places, N. J. to Sask., and southw.; casual northeastw. Apr.–July.

4. PHACÈLIA Juss.

Corolla open-bell-shaped, 5-lobed. Filaments slender, often (with the 2-cleft style) exserted; anthers ovoid or oblong. Ovary with 2 linear placentae adherent to the walls, the two often forming an imperfect partition in the ovoid 4–many-seeded capsule. Ovules 2–30 on each placenta. — Perennial or mostly annual herbs, with simple, lobed, or divided leaves, and often handsome (blue, purple, or white) flowers in scorpioid raceme-like cymes (to which the name, from φάκελος, *a fascicle*, doubtless alludes).

§ 1. EUPHACÈLIA Gray. *Seeds and ovules only* 4 (*two on each placenta*); *corolla campanulate, with narrow folds or appendages within, the lobes entire.*

1. **P. bipinnatífida** Michx. Biennial; stem upright, hairy, 2.5–6 dm. high; leaves long-petioled, pinnately 3–5-divided, the divisions ovate or oblong-ovate, acute, coarsely and often sparingly cut-lobed or pinnatifid; racemes elongated, loosely many-flowered, glandular-pubescent; pedicels about the length of the calyx, spreading or recurved; corolla bright blue, 1–1.5 cm. broad, with 5 pairs of longitudinal ciliate folds; stamens bearded below and with the style exserted. — Rich shaded banks, O. to Mo., and southw. May, June.

§ 2. COSMÁNTHUS (Nolte) Gray. *Ovules and seeds as in* § 1; *corolla almost rotate, with fimbriate lobes, and no appendages within; filaments villous-bearded, rarely exserted; leaves pinnatifid, the upper clasping.*

2. **P. Púrshii** Buckley. Sparsely hairy; stem erect or ascending, branched, 1.5–5 dm. high; *lobes of the stem-leaves* 5–9, *oblong or lanceolate, acute; raceme many-flowered; calyx-lobes lance-linear; corolla light blue*, varying to white, 1 cm. or so broad. — Moist woods, etc., Pa. to Minn., and southw.; locally introd. in e. Ont. and Ct. Apr.–June.

3. **P. fimbriàta** Michx. Slightly hairy, slender; stems spreading or ascending, 1–3 dm. long, few-leaved; lowest leaves divided into 3–5 roundish leaflets; the upper 5–7-cleft or cut-toothed, the *lobes obtuse; raceme* 3–10-*flowered; calyx-lobes linear-oblong, obtuse*, becoming spatulate; *corolla white*, barely 1 cm. broad. — Woods, high mts., Va. to Ala. May, June.

§ 3. COSMANTHOÌDES Gray. *Ovules and seeds* 2–8 *on each placenta; corolla rotate or campanulate, with entire lobes and no appendages.*

4. **P. dùbia** (L.) Small. *Somewhat hairy*, slender, diffusely spreading, 1–3 dm. high; leaves pinnately cleft or the lower divided into 3–5 short lobes; *racemes* solitary, loosely 5–15-*flowered;* pedicels filiform, mostly longer than the oblong calyx-lobes; *corolla* open-campanulate, bluish-white, 8–14 *mm. broad; filaments hairy;* capsule globular, 6–12-seeded, one half shorter than the calyx. (*P. parviflora* Pursh.) — Shaded banks, N. Y. to Kan., and southw. Apr.–June.

5. **P. hirsùta** Nutt. *More hirsute* and less slender; *corolla* larger, 13–15 *mm. in diameter;* seeds 4–8. — Prairies and barrens, Va. to Kan., and southw.

6. **P. Covíllei** Watson. Like the preceding; *racemes* 2–5-*flowered;* calyx-lobes linear, in fruit 6 mm. long or more; corolla tubular-campanulate, with erect limb; *filaments glabrous;* capsule depressed-globose; seeds 4, large. — Alluvial soil, D. C.; "Ill." Apr., May.

§ 4. EÙTOCA (R. Br.) Gray. *Ovules and seeds numerous on each placenta; corolla rotate-campanulate, with* 10 *vertical lamellae within.*

7. **P. Franklínii** (R. Br.) Gray. Soft-hairy; stem erect, 2–6 dm. high, rather stout; leaves pinnately parted into many lanceolate or oblong-linear lobes, which are crowded and often cut-toothed or pinnatifid; racemes short, dense, crowded into an oblong spike; calyx-lobes linear; corolla blue. — Dry soil and recent clearings, Ont. and Mich. to the Rocky Mts., and far northw. June–Aug.

5. HYDRÒLEA L.

Corolla 5-cleft. Filaments dilated at base. Capsule globular, with very large and fleshy many-seeded placentae, thin-walled, 2–4-valved or bursting irregularly. Seeds minute, striate-ribbed. — Herbaceous or scarcely shrubby, growing in water or wet places, often having spines in the leaf-axils, and clustered blue flowers. (Name unexplained, doubtless in part from ὕδωρ, *water*, in allusion to the aquatic habitat.) NAMA L., in part.

1. **H. affìnis** Gray. *Glabrous throughout;* stem ascending from a creeping base; *leaves lanceolate*, tapering to a very short petiole; *flowers in small axillary leafy-bracted clusters; divisions of calyx lance-ovate, equaling the corolla* and the irregularly bursting globose capsule. — Banks of streams, etc., Ill. to Tenn. and Tex. June–Aug.

2. **H. quadrivàlvis** Walt. Similar, but *villous-hispid above; divisions of calyx linear or linear-lanceolate.* — Wet ground, Va., and southw. July–Sept.

3. **H. ovàta** Nutt. Hirsute or puberulent; *leaves ovate;* flowers in *terminal leafy panicles; calyx hirsute, with lanceolate divisions shorter than the corolla.* — Mo. to La. and Tex. June–Aug.

BORAGINÀCEAE (BORAGE FAMILY)

Chiefly rough-hairy herbs, with alternate entire leaves, and symmetrical flowers with a 5-parted calyx, a regular 5-lobed corolla (except in Echium), *5 stamens inserted on its tube, a single style and a usually deeply 4-lobed ovary* (as in Labiatae), *forming in fruit 4 seed-like 1-seeded nutlets, or separating into two 2-seeded or four 1-seeded nutlets.* Albumen none. Cotyledons plano-convex; radicle pointing to the apex of the fruit. Stigmas 1 or 2. Calyx valvate, the corolla imbricated (in *Myosotis* convolute) in the bud. Flowers mostly on one side of the branches of a reduced cyme, imitating a spike or raceme, which is rolled up from the end, and straightens as the blossoms expand (circinate or scorpioid), often bractless. — A rather large family of innocent mucilaginous and slightly bitter plants; the roots of some species yielding a red dye.

N.B. — In this family the figures represent the inflorescence (or a portion of it) × ⅔ and details (flower, fruiting calyx, or nutlet) × 2.

Tribe I. HELIOTROPÌEAE. Ovary not lobed; fruit separating into 2–4 nutlets.

1. **Heliotropium.** Corolla salver-form. Stamens included. Nutlets 1–2-celled.

Tribe II. BORAGÍNEAE. Ovary deeply 4-parted, forming as many separate 1-seeded nutlets in fruit; style rising from the center between them.

* Nutlets attached laterally.

+ Nutlets armed with prickles; throat of corolla closed by 5 scales.

2. **Cynoglossum.** Nutlets horizontally radiate, much produced downward, covered with barbed prickles.

3. **Lappula.** Nutlets erect or ascending, the margin or back armed with barbed prickles.

+ + Nutlets at most granular-roughened.

4. **Amsinckia.** Calyx simply but deeply 5-cleft. Corolla yellow, with slender tube and open throat.

5. **Asperugo.** Calyx with 5 broad flat veiny lobes and 5 smaller alternating ones. Corolla blue.

* * Nutlets attached at or near the base, smooth or merely wrinkled, not prickly.

+ Throat of corolla closed by 5 scales.

++ Corolla and stamens regular; achene with large excavated scar.

6. **Symphytum.** Corolla short-tubular, enlarged above, closed by 5 linear-subulate scales.

++ ++ Corolla irregular, limb and throat oblique, and lobes unequal.

7. **Lycopsis.** Corolla-tube curved. Stamens included.

+ + Throat of corolla open or merely with folds or crests (not scales).

++ Corolla and stamens regular.

8. **Myosotis.** Corolla short salver-form, its lobes rounded, and throat crested. Racemes not leafy-bracted (or only exceptionally so at base).

9. **Mertensia.** Corolla trumpet- or funnel-shaped, with open or crested throat, usually blue. Nutlets fleshy or becoming dry, attached just above the base.

10. **Lithospermum.** Corolla salver-form to funnel-form, its rounded lobes spreading; the throat either naked or with low crests. Racemes leafy-bracted.

11. **Onosmodium.** Corolla tubular, unappendaged, its erect lobes acute. Racemes leafy-bracted.

++ ++ Corolla irregular, limb and throat oblique, and lobes unequal.

12. **Echium.** Dilated throat of corolla unappendaged. Stamens unequal, exserted.

1. HELIOTRÒPIUM [Tourn.] L. Turnsole. Heliotrope

Corolla salver-form or funnel-form, unappendaged, more or less plaited in the bud. Anthers nearly sessile. Style short; stigma conical or capitate. Fruit separating into 2 indurated 2-celled and 2-seeded closed carpels, or more commonly into 4 one-seeded nutlets. — Herbs or low shrubby plants; leaves entire; fl. in summer. (The ancient name, from ἥλιος, *the sun*, and τροπή, *a turn*, with reference to its flowering at the summer solstice.)

§ 1. EUHELIOTRÒPIUM Griseb. *Fruit 4-lobed, separating into four 1-celled 1-seeded nutlets; style short.*

* *Flowers in bractless one-sided scorpioid spikes.*

849. H. curassavicum.

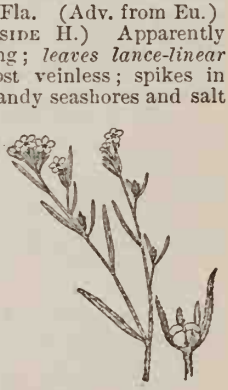
1. H. europaèum L. Erect annual, 1.5–8 dm. high, *hoary-pubescent; leaves oval*, long-petioled; lateral spikes single, the terminal in pairs; calyx spreading in fruit, hairy; corolla white, rarely 4 mm. broad. — Waste and ballast ground, Mass. to D. C. and Fla. (Adv. from Eu.)

2. H. curassávicum L. (Seaside H.) Apparently annual, *glabrous;* stems ascending; *leaves lance-linear or spatulate*, thickish, pale, almost veinless; spikes in pairs; flowers white or bluish. — Sandy seashores and salt marshes, from Del. southw.; saline soils, s. Ill., southw. and westw.; ballast and waste places near the coast, locally northw. to Me. Fig. 849.

* * *Inflorescence not at all scorpioid; flowers scattered.*

851. H. indicum.

3. H. tenéllum (Nutt.) Torr. Stem 1.5–4 dm. high, paniculately branched, slender, strigose-canescent; leaves narrowly linear, with revolute margins; flowers white, often bractless. — Open dry ground, Ky. to Kan., and southw. Fig. 850.



850. H. tenellum.

§ 2. TIARÍDIUM (Lehm.) Gray. *Fruit 2-lobed, separating into two 2-celled 2-seeded carpels, with sometimes a pair of empty false cells; style very short; flowers in bractless scorpioid spikes.*

4. H. indicum L. Erect and hairy annual; leaves petioled, ovate or oval and somewhat heart-shaped; spikes single; corolla blue; fruit 2-cleft, miter-shaped, with an empty false cell before each seed-bearing cell. — Waste places, Ky. to Ind., Mo., and southw.; also on ballast northw. (Adv. from India.) Fig. 851.

2. CYNOGLÓSSUM [Tourn.] L. Hound's Tongue

Corolla funnel-form, the tube about equaling the 5-parted calyx; lobes rounded. Stamens included. Nutlets depressed or convex, oblique, fixed near the apex to the base of the style, roughened all over with short barbed or hooked prickles. — Coarse herbs, with petioled lower leaves; the mostly panicled (so-called) racemes naked above, usually bracted at base. (Name from κύων, *a dog*, and γλῶσσα, *tongue;* from the shape and texture of the leaves.)

1. **C. officinàle** L. (Common H.) Biennial, *clothed with short soft hairs, leafy*, panicled above; upper leaves lanceolate, closely sessile by a rounded or slightly heart-shaped base; racemes nearly bracteless; *corolla reddish-purple* (rarely white); nutlets flat on the broad upper face, somewhat margined. — Waste ground and pastures, locally abundant, the large nutlets adhering to the fleece of sheep, etc. (Nat. from Eu.) — Strong-scented. Fig. 852.

852. C. officinale.

2. **C. virginiànum** L. (Wild Comfrey.) Perennial, *roughish with spreading bristly hairs;* stem simple, *few-leaved*, 3–8 dm. high; stem-leaves lanceolate-oblong, clasping by a deep heart-shaped base; *racemes few and corymbed, raised on long naked peduncles*, bracteless; *calyx* in anthesis 3.5–4.5 *mm. long; corolla pale blue*, 1–1.2 *cm. broad, with suborbicular lobes and closed sinuses; nutlets* strongly echinate, compressed-orbicular-obovoid, enneate at base, 7–9 *mm. long.* — Open deciduous woods, N. J. to Mo., southw. and southwestw. May.

3. **C. boreàle** Fernald. Similar, but more slender; stems villous-hispid at base, appressed-pubescent above; only the upper stem-leaves clasping; *calyx* in anthesis 2–2.5 *mm. long; corolla* 6–8 *mm. broad, the lobes oblong-ovate, the sinuses open; nutlets* compressed-pyriform-obovoid, 4–5 *mm. long.* (*C. virginicum* Man. ed. 6, in part.) — Open woods and alluvial banks, e. Que. to B. C., s. to Ct., N. Y., Mich., and Minn. May, June.

3. LÁPPULA [Rivinius] Moench. Stickseed

Corolla salver-form, short, imbricated in the bud. Stamens included. Nutlets fixed to the base of the style or central column, triangular or compressed, the back armed with prickles which are barbed at the apex, otherwise naked. — Rough-hairy and grayish herbs, with small blue to whitish flowers in racemes or spikes; flowering all summer. (Name a diminutive of *lappa*, a bur.) Echinospermum Sw.

* *Slender pedicels recurved or deflexed in fruit; calyx-lobes short, at length reflexed; biennial or perennial, not hispid.*

1. **L. virginiàna** (L.) Greene. (Beggar's Lice.) Stem 3–12 dm. high; radical leaves round-ovate or cordate, slender-petioled; cauline 0.5–2.5 dm. long, ovate-oblong to oblong-lanceolate, acuminate at both ends; loosely paniculate racemes divaricate; pedicel and flower each about 2 mm. long; *nutlets of the globose fruit equally short-glochidiate over the whole back.* (*Echinospermum virginicum* Lehm.) — Woods, thickets, and waysides, Me. and w. Que., westw. and southw. Fig. 853.

853. L. virginiana.

2. **L. defléxa** (Wahlenb.) Gareke. Diffusely branched, 0.3–1 m. high; leaves oblong to lanceolate; racemes lax, loosely paniculate; flowers small; *the globular-pyramidal fruit*

854. L. deflexa.

855. L. defl., v. amer.

3–4 mm. long, the nutlets only marginally glochidiate. (*Echinospermum* Lehm.) — Calcareous mountains and cliffs, e. Que.; roadsides and waste places, N. B. to Minn., local. (Eurasia.) Fig. 854.

Var. americàna (Gray) Greene. Nutlets with a few prickles along the middle. — Thickets and open woods, Ia. to Man., westw. and northw. Fig. 855.

3. L. floribúnda (Lehm.) Greene. Rather strict, 0.3–1.5 m. high; leaves oblong- to linear-lanceolate, the lowest tapering into margined petioles; racemes numerous, commonly geminate and in fruit rather strict; corolla larger, blue, sometimes white, 0.5–1 cm. in diameter; *nutlets 4–6 mm. long*, scabrous and margined with a close row of flat-subulate prickles. (*Echinospermum* Lehm.) — Ont. and Minn. to Sask., and westw. Fig. 856.

856. L. floribunda.

857. L. echinata.

* * *Stout pedicels not deflexed; calyx becoming foliaceous; leaves linear, lanceolate, or the lower spatulate; hispid annuals.*

4. L. echinàta Gilibert. Erect, 1.5–6 dm. high; *nutlets* rough-granulate or tuberculate on the back, *the margins with a double row of slender distinct prickles*, or these irregularly distributed over most of the back. (*Echinospermum Lappula* Lehm.) — Waste and cultivated grounds, local. (Nat. from Eu.) Fig. 857.

5. L. Redówskii (Hornem.) Greene, var. occidentàlis (Wats.) Rydb. Erect, 1.5–6 dm. high, at length diffuse; *nutlets* irregularly and minutely sharp-tuberculate, *the margins armed with a single row of stout flattened prickles* sometimes confluent at base. (*L. texana* Britton.) — Ont. to Sask. and Tex., and westw.; ballast and waste places, eastw. Fig. 858.

858. L. Redowskii, v. occ.

4. AMSÍNCKIA Lehm.

Corolla salver-form or tubular-funnel-form. Style filiform. Nutlets rough, dull, ovoid-trigonous, attached below the middle. — Rough-hairy annuals, with oblong or narrower leaves and scorpioid-spicate yellow flowers, at least the lowest leafy-bracted. (Dedicated to the memory of *Wilhelm Amsinck*, a burgomaster of Hamburg, who gave important support to the botanical garden of that city.)

859. A. lycopsoides.

1. A. lycopsoìdes Lehm. Decumbent, loosely branched, 3–6 dm. high; leaves lanceolate or ovate-lanceolate, the lower 0.5–1 dm. long, the upper shorter; flowers mostly bractless; corolla pale yellow, 7–10 mm. long, the slender tube exceeding the calyx. — Waste places, etc., locally established, e. Mass. to Ct. May–July. (Adv. from Cal.) Fig. 859.

5. ASPERÙGO [Tourn.] L.

Madwort

Corolla with short tube slightly enlarged above, and with spreading limb, smaller than the conspicuous calyx. Stamens included. Nutlets granulated. — Low annual with harsh slender stems, oblong or spatulate leaves, and few axillary flowers on short recurved pedicels. (Name from *asper*, rough.)

1. A. procùmbens L. — Ballast and made land, Mass. to D. C. and Minn. May–July. (Adv. from Eu.) Fig. 860.

860. A. procumbens.

6. SÝMPHYTUM [Tourn.] L. Comfrey

Corolla 5-toothed, the short teeth spreading. Stamens included; anthers elongated. Style thread-form. Nutlets erect, fixed by the large hollowed base, which is finely toothed on its margin. — Coarse perennial herbs, with thickened bitterish mucilaginous roots; the nodding raceme-like clusters either single or in pairs. (Ancient Greek name from *συμφύειν*, *to cause to grow together*, probably for its reputed healing virtues.)

861. S. officinale.

1. **S.** officinàle L. (Common C.) *Hairy*, branched; upper *leaves decurrent* upon the stem *in broad cuneate wings*, the lower large, ovate or ovate-lanceolate; calyx-segments lance-linear; corolla yellowish- or pinkish-white to bluish- or roseate-purple; *nutlets nearly smooth, somewhat shining.* — Moist places, escaped from gardens. June, July. (Introd. from Eu.) Fig. 861.

2. **S.** tuberòsum L. Erect and rather slender from a knotted tuberous base, *pubescent; leaves* mostly elliptic-ovate or -lanceolate, petiolate, the petioles *decurrent as very narrow wings* upon the stem; calyx-segments lanceolate, finely appressed-pubescent and somewhat hirsute; corolla yellowish-white; *nutlets granulate-tuberculate, dull.* — Low sandy meadows, Southington, Ct. (*Andrews*), and very likely elsewhere. (Adv. from Eu.)

3. **S.** aspérrimum Donn. *Harsh with short recurved prickle-like hairs; leaves not decurrent;* calyx very small, in anthesis 2–4 mm. long, prickly-hispid all over; corolla chiefly purple. — Low ground, not rare. (Introd. from Eu.)

7. LYCÓPSIS L. Bugloss

Corolla funnel-shaped, with curved tube and slightly unequal limb; the throat closed with 5 convex obtuse bristly scales opposite the lobes. Stamens and style included. Nutlets rough-wrinkled, erect, fixed by a hollowed-out base. — Annuals. (Name from *λύκος*, *a wolf*, and *ὄψις*, *appearance*.)

1. **L.** arvénsis L. (Small B.) Very rough-bristly, 1–6 dm. high; leaves lanceolate; flowers in leafy raceme-like clusters; calyx as long as the tube of the small blue corolla. — Dry or sandy fields and waste places, Que. to Va., Minn., and Ont., scarce. (Adv. from Eu.) Fig. 862.

862. L. arvensis.

8. MYOSÒTIS [Rupp.] L. Scorpion-grass. Forget-me-not

Corolla-tube about the length of the 5-toothed or 5-cleft calyx, the throat with 5 small and blunt arching appendages opposite the rounded lobes; the latter convolute in the bud! Stamens included, on very short filaments. Nutlets compressed. — Low and mostly soft-hairy herbs, with entire leaves, those of the stem sessile, and with small flowers in naked racemes, which are entirely bractless, or occasionally with small leaves next the base, prolonged and straightened in fruit. (Name composed of *μῦς*, *mouse*, and *οὖς*, *ear*, from the short and soft leaves in some species.)

* *Calyx open in fruit, its hairs appressed, none of them hooked or glandular.*

1. **M.** scorpioìdes L. (True F.) Perennial; stems ascending from an oblique creeping base. 3–7 dm. high, loosely branched, smoothish; leaves

863. M. scorpioides.

rough-pubescent, oblong-lanceolate or linear-oblong; *calyx-lobes much shorter than its tube;* limb of corolla 5–8 mm. broad, sky-blue, with a yellow eye. (*M. palustris* Hill.) — In wet ground, Nfd. to w. N. Y., and southw. May–Sept. (Nat. from Eu.) Fig. 863.

2. **M. láxa** Lehm. Perennial from filiform subterranean shoots; stems very slender, decumbent; pubescence all appressed; leaves lanceolate-oblong or somewhat spatulate; *calyx-lobes as long as the tube;* limb of corolla rarely 5 mm. broad, paler blue. — In water and wet ground, Nfd. to Ont., and southw. May–Aug. (Eu.) Fig. 864.

864. M. laxa.

* * *Calyx closing or the lobes erect in fruit, clothed with spreading hairs, some minutely hooked or gland-tipped; corolla small; annual or biennial.*

← *Calyx about equally 5-cleft.*

↔ *Pedicels in fruit longer than the calyx.*

865. M. arvensis.

3. **M. arvénsis** (L.) Hill. Hirsute with spreading hairs, erect or ascending, 1–4.5 dm. high; leaves oblong-lanceolate, acutish; *racemes naked at the base and stalked;* corolla blue, rarely white. — Fields, etc., Nfd. to Minn. and W. Va. June–Aug. (Eu.) Fig. 865.

↔ ↔ *Pedicels shorter than the calyx, the latter about 4 mm. long.*

4. **M. versícolor** (Pers.) Sm. Slender, 1–3 dm. high, *mostly simple at base, often branched above; stems and leaves uniformly pubescent with ascending straightish hairs; upper leaves somewhat pointed; racemes* loose, mostly *naked at base; pedicels appressed-pubescent;* corolla pale yellow, changing to blue, then to violet, the tube exceeding the calyx; *style distinctly longer than the nutlets.* — Fields, "N. Y.," and Del. May–July. (Nat. from Eu.) Fig. 866.

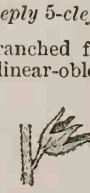
866. M. versicolor.

5. **M. micrántha** Pallas. Stems 0.5–2 dm. high, *branching from the base, with the oblong or lanceolate blunt leaves pubescent with mixed straight and divergent hooked hairs; scattered flowers produced from the lower axils; pedicels* very short, mostly *with* some *divergent hooked hairs;* corolla blue, the tube barely equaling the calyx; *style rarely equaling the nutlets.* (*M. collina* Am. auth., not Hoffm.) — Roadsides, old fields, etc., Mass. to Ont. and O. May–Aug. (Nat. from Eu.) Fig. 867.

867. M. micrantha.

← ← *Calyx somewhat 2-lipped, unequally and deeply 5-cleft.*

6. **M. virgínica** (L.) BSP. Bristly-hirsute, branched from the base, erect, 0.5–4 dm. high; leaves obtuse, linear-oblong, or the lower spatulate-oblong; racemes leafy at the base; corolla very small, white, with a short limb; pedicels in fruit erect and appressed at the base, usually abruptly bent outward near the apex; calyx very hispid, 3–5 mm. long. (*M. verna* Nutt.) — Dry banks and rocky woods, Me. to Ont. and Minn., westw. and southw. Apr.–July. Fig. 868. Passing westw. and southw. to the larger formal var. macrospérma (Engelm.) Fernald (*M. macrosperma* Engelm.), with looser inflorescence and larger calyx and nutlets.


868. M. virginica.

9. MERTÉNSIA Roth. LUNGWORT

Corolla longer than the deeply 5-cleft or 5-parted calyx, naked, or with 5 small glandular folds or appendages in the open throat. Anthers oblong or arrow-shaped. Style long and thread-form. Nutlets ovoid, fleshy when fresh, smooth or wrinkled, obliquely attached by a prominent internal angle; the scar small. — Smooth or soft-hairy perennial herbs, with pale and entire leaves, and handsome purplish-blue (rarely white) flowers, in loose and short panicled or corymbed raceme-like clusters, only the lower one leafy-bracted; pedicels slender. (Named for *Franz Karl Mertens*, a German botanist.)

869. M. virginica.

* *Corolla trumpet-shaped, with spreading nearly entire limb and naked throat; filaments slender, exserted; hypogynous disk 2-lobed.*

1. **M. virgínica** (L.) Link. (VIRGINIAN COWSLIP, BLUEBELLS.) Very smooth, pale, erect, 2–6 dm. high; leaves obovate, veiny, those at the root 1–1.5 dm. long, petioled; corolla trumpet-shaped, 2–2.5 cm. long, many times exceeding the calyx, light blue (pinkish in bud), rarely white; nutlets dull and roughish. — Alluvial banks, N. Y. and Ont. to Neb., and southw. Apr., May. FIG. 869.

* * *Corolla with conspicuously 5-lobed limb and crested throat.*

+ *Filaments broad and short; nutlets dull, wrinkled or roughish when dry.*

2. **M. paniculàta** (Ait.) G. Don. Roughish and more or less hairy, erect, 0.3–1 m. high, loosely branched; *leaves ovate and ovate-lanceolate, taper-pointed, ribbed, thin;* corolla 1–1.5 cm. long, somewhat funnel-form, 3–4 times the length of the lance-linear acute divisions of the calyx; filaments broader and shorter than the anthers. — Shore of L. Superior, northw. and westw. July, Aug.

+ + *Filaments longer and narrower than the anthers; nutlets shining, utricular.*

3. **M. marítima** (L.) S. F. Gray. (SEA L.) Spreading or decumbent, smooth, glaucous; leaves ovate, obovate, or spatulate, fleshy, the upper surface becoming papillose; corolla white, rose-pink, or blue, bell-funnel-form, 5–7 mm. long, twice the length of the calyx. (*Pneumaria* Hill.) — Sea-coast, on rocks and sand, Nantucket, Mass., and northw. June–Sept. (Eurasia.) FIG. 870.

870. M. maritima.

10. LITHOSPÉRMUM [Tourn.] L. GROMWELL. PUCCOON

Throat of corolla naked, or with a more or less evident transverse fold or scale-like appendage opposite each lobe; the limb 5-cleft. Anthers oblong, almost sessile, included. Nutlets smooth or roughened, mostly bony or stony; scar nearly flat. — Herbs, with thickish and commonly red roots and sessile leaves; flowers solitary and as if axillary, or spiked and leafy-bracted, sometimes dimorphous as to insertion of stamens and length of style. (Name formed of λίθος, *stone*, and σπέρμα, *seed*, from the hard nutlets.)

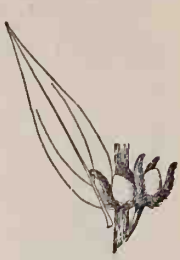
§ 1. RHYTISPÉRMUM (Link) Reichenb. *Nutlets tubercled or rough-wrinkled and pitted, gray and dull; throat of the (nearly white) corolla destitute of any evident folds or appendages.*

1. **L. ARVÉNSE** L. (CORN G.) Minutely roughened and hoary, annual or biennial; stems erect, 2–7 dm. high; leaves lanceolate or linear, veinless;

871. L. arvense.

corolla scarcely longer than the calyx. — Sandy fields and roadsides, Me. to Ont., Kan., and southw. May–Aug. (Nat. from Eu.) Fig. 871.

§ 2. EULITHOSPÈRMUM DC. *Nutlets smooth and shining, white like ivory; corolla greenish-white or pale yellow, small, with 5 distinct pubescent crests in the throat; perennial.*



872. L. officinale.

2. L. OFFICINÀLE L. (COMMON G.) Much branched above, erect, 0.3–1 m. high; *leaves thinnish, broadly lanceolate, acute*, with a few distinct veins, rough above, soft-pubescent beneath; *corolla exceeding the calyx.* — Roadsides and pastures, c. Que. to Minn. and N. J. (Nat. from Eu.) Fig. 872.

873. L. latifolium.

3. L. latifòlium Michx. Stem loosely branched, erect, 5–9 dm. high, rough; *leaves ovate and ovate-lanceolate, mostly taper-pointed* (even the floral ones 3–9 cm. long), *ribbed-veined*, roughish above, finely soft-pubescent beneath, the basal leaves large and rounded; *corolla shorter than the calyx.* — Open ground and borders of woods, w. Que. and N. Y. to Minn., s. to Va. and Ark. Fig. 873.

§ 3. BÁTSCHIA (G. F. Gmel.) Endl. *Nutlets white, smooth and shining; corolla large, salver-form or nearly so, deep orange-yellow, somewhat pubescent, the tube much exceeding the calyx, and the throat appendaged; roots perennial, long and deep, yielding a red dye.*

* *Corolla-tube one half to twice longer than the calyx, not much longer than the ample limb, the lobes entire; appendages little if at all projecting.*

4. L. Gmelìni (Michx.) Hitchc. *Hispid* with bristly hairs, 2–8 dm. high; stem-leaves lanceolate or linear, those of the flowering branches ovate-oblong, bristly-ciliate; *corolla woolly-bearded at the base inside*, the limb 1.5–2.5 cm. broad; *flowers distinctly peduncled*, crowded, showy; *fruiting calyx* 1 cm. or more long, 3–4 *times longer than the nutlets.* (*L. hirtum* Lehm.) — Pine barrens, etc., N. Y. to Minn., southw. and westw. Apr.–June.

874. L. canescens.

5. L. canéscens (Michx.) Lehm. (PUCCOON.) *Softly hairy* and more or less *hoary*, 2–5 dm. high; *leaves obtuse*, linear-oblong, or the upper ovate-oblong, more or less *downy beneath* and roughish with close appressed hairs above; *flowers sessile; corolla naked at the base within; fruiting calyx* 6–8 mm. long, *barely twice the length of the nutlets.* — Plains and open woods, in sandy soil, Ont. to N. J., Va., Ala., and westw. Apr., May. Fig. 874.

** *Corolla-tube in well developed flowers 2–4 times the length of the calyx and of its erose-toothed lobes, and the appendages conspicuous and arching; later flowers small, cleistogamous.*

6. L. angustifòlium Michx. Erect or diffusely branched from the base, 1–5 dm. high, minutely rough-strigose and hoary; leaves linear; flowers pedicelled, leafy-bracted, of two sorts; the earlier large and showy (corolla-tube 1.5–3.5 cm. long), the later and those of more diffusely branching plants with inconspicuous or small and pale corollas, without crests, and the pedicels commonly recurved in fruit; nutlets usually punctate. (*L. linearifolium* Goldie.) — Dry

and sterile or sandy soil, s. Ont., Ind., and Mich. to N. Dak., Tex., and westw. Apr.–July.

11. ONOSMÒDIUM Michx. False Gromwell

Divisions of calyx linear and erect. Corolla tubular, or tubular-funnel-form (the sinuses minutely hooded-inflexed), the 5 acute lobes converging or barely spreading. Anthers oblong-linear or arrow-shaped, mucronate, inserted in the throat. Style thread-form, much exserted. Nutlets bony, ovoid, erect; the scar not hollowed out. — Chiefly perennial herbs, coarse and hispid, with oblong and sessile rib-veined leaves, and white, greenish, or yellowish flowers in at length elongated and erect leafy raceme-like clusters; fl. in summer. (Named from a likeness to the genus *Onosma*, meaning *ass-smell.*)

875. O. virginianum.

* *Corolla-lobes lance-subulate, 2–3 times as long as wide.*

1. **O. virginiànum** (L.) A. DC. Clothed with harsh and rigid appressed short bristles; stems rather slender, 3–8 dm. high; leaves narrowly oblong or oblong-lanceolate, 3–9 cm. long, the lower narrowed at base; nutlets 2–2.8 mm. long, irregularly pitted, not conspicuously constricted at base. — Dry banks, sandy hillsides, etc., Mass. to Fla. and La. Fig. 875.

* * *Corolla-lobes deltoid, scarcely longer than broad.*

+ *Stem hispid, villous, or hirsute to the base.*

++ *Silky-pubescent; nutlets conspicuously pitted.*

2. **O. mólle** Michx. Finely grayish-pubescent; the lowest leaves oblanceolate, the others ovate to ovate-lanceolate, conspicuously veined, acutish; calyx silky as well as sparingly hirsute; nutlets 3 mm. long, pitted, sometimes slightly constricted at the base. (*O. carolinianum*, var. Gray, in part.) — Old fields and cedar barrens, Ky. and Tenn.

++ ++ *Strigose to hirsute; nutlets scarcely or not at all pitted.*

3. **O. occidentàle** Mackenzie. Stoutish and somewhat rigid, 4–6 dm. high, rather finely but copiously grayish-pubescent; leaves lanceolate to narrowly lance-ovate, strongly rib-veined, 4–8 cm. long, 1–1.8 cm. wide, with pubescence mostly appressed or subappressed; *nutlets rounded and not at all constricted at the base.* (*O. carolinianum*, var. *molle* Gray, in part.) — Alluvial soil, sandy or gravelly banks, etc., Ill. to Sask., Col., and N. Mex. Var. sylvéstre Mackenzie. Taller, 1 m. or more high, less canescent and more shaggy-hirsute in the manner of the next species, but with nutlets unconstricted at the base. — Ill. and Mo.

876. O. hispidissimum.

4. **O. hispidíssimum** Mackenzie. Stout, erect, 10–12 dm. high, green, coarsely hirsute throughout; stem-leaves ovate, 8–10 cm. long, 1.8–4 cm. wide, the pubescence mostly spreading; *nutlets* about 3 mm. long, *with a very short neck or constriction at the base*, brownish tinged. (*O. carolinianum* Man. ed. 6, not DC.) — River-banks, rich bottoms, etc., N. Y. and s. Ont. to Neb., and southw. Fig. 876. Var. macrospérmum Mackenzie & Bush, with larger and more shining white nutlets nearly 4 mm. long, is distinguishable in Ill. and Mo.

+ + *Stem essentially smooth and glabrous below.*

5. **O. subsetòsum** Mackenzie & Bush. Stem erect, nearly or quite glabrous to the middle, 6 dm. or more in height; leaves narrowly lanceolate, finely

appressed-pubescent upon both surfaces, 6–8 cm. long, 1–1.5 cm. wide; nutlets brownish-white, not constricted at the base, usually pitted, 2–3 mm. long. — Rocky hills and barrens of the Ozark region, Mo. and Ark.

877. E. vulgare.

12. ÈCHIUM [Tourn.] L. Viper's Bugloss

Corolla with a cylindraceous or funnel-form tube; lobes rounded, spreading. Stamens mostly exserted, unequal. Style thread-form. Nutlets roughened or wrinkled, fixed by a flat base. (A plant name used by Dioscorides from ἔχις, *a viper.*)

1. **E. vulgàre** L. (Blue-weed, Blue Devil.) Rough-bristly biennial; stem erect, 3–9 dm. high; stem-leaves linear-lanceolate, sessile; flowers showy, in short lateral clusters, disposed in a long and narrow thyrse or in an open panicle; buds pink; corolla brilliant blue (rarely pale or roseate). — Roadsides and meadows, locally abundant. June–Sept. (Nat. from Eu.) Fig. 877.

VERBENÀCEAE (Vervain Family)

Herbs or shrubs, with opposite leaves, more or less 2-lipped or irregular corolla, and didynamous stamens, the 2–4-celled fruit dry or drupaceous, usually splitting when ripe into as many 1-seeded indehiscent nutlets; resembling the following family, but the ovary not 4-lobed, the style therefore terminal, and the plants seldom aromatic or furnishing a volatile oil. Seeds with straight embryo and little or no albumen. — A large family in the Tropics, sparingly represented in cool regions.

1. **Verbena.** Flowers in spikes or heads. Calyx tubular. Fruit splitting into 4 nutlets.
2. **Lippia.** Flowers in spikes or heads. Calyx short, 2-cleft. Fruit splitting into 2 nutlets.
3. **Callicarpa.** Flowers in axillary cymes. Calyx short. Fruit berry-like, with 4 nutlets.

1. VERBÈNA [Tourn.] L. Vervain

Calyx 5-toothed, one of the teeth often shorter than the others. Corolla tubular, often curved, salver-form; the border somewhat unequally 5-cleft. Stamens included, the upper pair occasionally without anthers. Style slender; stigma mostly 2-lobed. — Flowers sessile, in single or often panicled spikes, bracted, produced all summer. (The Latin name for any sacred herb; derivation obscure.) — The species present numerous spontaneous hybrids.

§ 1. *Anthers not appendaged; flowers small, in slender spikes.*

* *Spikes filiform, with flowers or at least fruit scattered, naked, the inconspicuous bracts shorter than the calyx.*

1. **V. officinàlis** L. (European V.) Annual, glabrous or nearly so, loosely branched, 3–9 dm. high; *leaves pinnatifid or 3-cleft, oblong-lanceolate,* sessile, smooth above, the lobes cut and toothed; spikes panicled; *flowers purplish,* very small. — Roadsides, waste places, and old fields, especially from the Middle States westw. and southw. (Nat. from Eu.) Fig. 878

878. V. officinalis × ½.

2. **V. urticaefòlia** L. (White V.) Perennial, from minutely pubescent to almost glabrous, rather tall (0.5–1.5 m. high); *leaves oval or oblong-ovate, acute, coarsely serrate, petioled;* spikes at length much elongated, loosely panicled; *flowers* very small, *white.* — Thickets, roadsides, and waste ground. (Trop. Am.)

Var. **ripària** (Raf.) Britton. Leaves deeply cleft or incised; flowers blue. — N. J. to Va. and N. C.

** *Spikes thicker or densely flowered; the fruits crowded, mostly overlapping one another; bracts inconspicuous, not exceeding the flowers; perennial.*

3. **V. angustifòlia** Michx. Low, 2–6 dm. high, often simple; *leaves narrowly lanceolate, tapering to the base, sessile, roughish*, slightly toothed; spikes few or single; the purple flowers crowded, larger than in the next. — Dry or sandy ground, Mass. and s. Vt. to Minn., and southw.; rarely adventive further northeastw. Fig. 879.

879. V. angustifolia × ⅓.

4. **V. hastàta** L. (Blue V.) Tall (0.5–2 m. high); *leaves lanceolate or oblong-lanceolate*, taper-pointed, cut-serrate, *petioled, the lower often lobed and sometimes halberd-shaped* at base; *spikes linear, erect*, corymbed or panicled; flowers violet-blue (rarely pink or white). — Damp grounds, etc.

5. **V. stricta** Vent. (Hoary V.) *Downy with soft whitish hairs*, erect, simple or branched, 3–9 dm. high; *leaves sessile, obovate or oblong, serrate; spikes thick*, somewhat clustered, hairy; flowers rather large, purple. — Barrens and prairies, Ont. and O., westw. and southw.; rarely nat. eastw.

*** *Spikes thick, sessile and leafy-bracted; annual.*

6. **V. bracteòsa** Michx. Widely spreading or procumbent, hairy; leaves wedge-lanceolate, cut-pinnatifid or 3-cleft, short-petioled; spikes single, remotely flowered; bracts large, the lower pinnatifid, longer than the small purple flowers. — Prairies and waste grounds, Va. to O., westw. and southw.; on ballast and in waste places northeastw.

§ 2. *Anthers of the longer stamens glandular-tipped; flowers showy, from depressed-capitate becoming spicate.*

7. **V. bipinnatífida** Nutt. *Hispid-hirsute*, 1–4 dm. high; *leaves bipinnately parted*, or 3-parted into more or less bipinnatifid divisions, the lobes commonly linear or broader; *bracts mostly surpassing the calyx; limb of* bluish-purple or lilac *corolla* 1–1.5 *cm. broad.* — Plains and prairies, Mo. to S. Dak. and Mex. Fig. 880.

880. V. bipinnatifida × ⅓.

8. **V. canadénsis** (L.) Britton. Slender, 5 dm. high or less, *soft-pubescent or glabrate; leaves ovate or ovate-oblong in outline, with a wedge-shaped base, incisely lobed and toothed*, often more deeply 3-cleft; *bracts shorter than or equaling the calyx; limb of* reddish-purple or lilac (rarely white) *corolla* 1.5–2.5 *cm. broad.* (*V. Aubletia* Jacq.; *V. Drummondi* of auth.) — Open woods and prairies, Va. to Fla.; also Ind. to Kan., and southw.

881. L. lanceolata × ⅓.

2. LÍPPIA [Houston] L.

Calyx often flattened, 2–4-toothed, or 2-lipped. Corolla 2-lipped, upper lip notched, lower much larger, 3-lobed. Stamens included. Style slender; stigma obliquely capitate. (Dedicated to *Agostino Lippi*, Italian naturalist.)

1. **L. lanceolàta** Michx. (Fog-fruit.) Decumbent or procumbent, *green; leaves oblanceolate to lanceolate*, serrate above; *peduncles axillary, slender, exceeding the leaves*, bearing solitary

882. L. nodiflora × ⅓.

closely bracted heads of bluish-white flowers; *bracts mucronate or pointless.* — River-banks, N. J. to s. Ont. and Minn., s. to Fla. and Tex. May–Sept. Fig. 881.

2. **L. nodiflòra** (L.) Michx. Similar, but more depressed, *cinereous or greenish; leaves blunter and more spatulate;* corolla rose-purple or white. — Mo. to N. C. and Tex. May–Sept. Fig. 882.

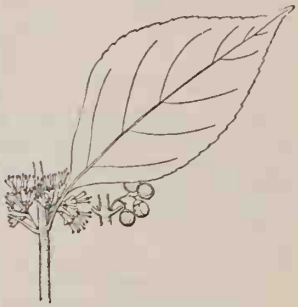
3. **L. cuneifòlia** (Torr.) Steud. Diffusely branched from a woody base, procumbent (*not creeping*), *minutely canescent throughout; leaves rigid, cuneate-linear*, incisely 2–6-toothed above the middle; *peduncles* axillary, *often shorter than the leaves; bracts* rigid, broadly cuneate, *abruptly acuminate;* corolla pale. — Plains, Neb., Kan., and westw. May–Sept.

3. CALLICÁRPA L.

Calyx 4–5-toothed. Corolla tubular-bell-shaped, 4–5-lobed, nearly regular. Stamens 4, nearly equal, exserted; anthers opening at the apex. Style slender, thickened upward. — Shrubs, with scurfy pubescence, and small flowers. (Name formed of κάλλος, *beauty*, and καρπός, *fruit*.)

1. **C. americàna** L. (French Mulberry.) *Leaves* ovate-oblong with a tapering base, acuminate, toothed, *whitish-tomentose beneath;* cymes many-flowered; calyx obscurely 4-toothed; *corolla bluish;* fruit violet-color. — Rich soil, Va. to Mo. and Tex. May–July. Fig. 883.

2. **C. purpùrea** Juss. *Leaves* elliptic, *glabrous beneath*, glandular-dotted; *corolla pink.* — Swamp, Wilmington, Del. (*Tatnall*). Aug. (Introd. from Asia.)



883. C. americana × ⅓.

LABIÀTAE (Mint Family)

Chiefly herbs, ordinarily with square stems, opposite aromatic leaves, more or less 2-lipped corolla, didynamous stamens or these only two, and a deeply 4-lobed ovary, which forms in fruit 4 little seed-like nutlets or achenes, surrounding the base of the single style in the bottom of the persistent calyx, each filled with a single erect seed. Nutlets smooth or barely roughish and fixed by their base, except in the first tribe. Albumen mostly none. Embryo straight (except in *Scutellaria*); radicle at the base of the fruit. Upper lip of the corolla 2-lobed or sometimes entire; the lower 3-lobed. Stamens inserted on the tube of the corolla. Style 2-lobed at the apex. Flowers axillary, chiefly in cymose clusters, these often aggregated in terminal spikes or racemes. — Foliage mostly dotted with small glands containing a volatile oil, upon which depends the warmth and aroma of the plants of this large and well known family.

I. Nutlets rugose-reticulated, attached obliquely or ventrally; ovary merely 4-lobed.

Tribe I. AJÙGEAE. Stamens 4, ascending and parallel, mostly exserted from the upper side of the corolla. Calyx 5–10-nerved.

* Limb of corolla irregular, seemingly unilabiate, the upper lip being either split down or very short; stamens exserted from the cleft.

1. **Ajuga.** Corolla with a very short and as if truncate upper lip.
2. **Teucrium.** Corolla deeply cleft between the 2 small lobes of the upper lip.

* * Limb of corolla merely oblique, of 5 nearly equal and similar lobes.

3. **Isanthus.** Calyx bell-shaped. Corolla small, the lobes spreading. Stamens included.
4. **Trichostema.** Corolla-lobes all declined. Calyx oblique. Stamens much exserted.

II. Nutlets smooth or granulate; scar basal, small; ovary deeply 4-parted.

Tribe II. **SCUTELLARIEAE.** Stamens 4, ascending and parallel. Calyx bilabiate, closed in fruit; the rounded lips entire. Corolla bilabiate, the upper lip arched.

5. **Scutellaria.** Calyx with a helmet-like projection on the upper side.

Tribe III. **STACHYEAE.** Stamens ascending or spreading, extended straight forward. Calyx usually open in fruit, without a projection on the upper side.

* Stamens and style included in the corolla-tube.

6. **Marrubium.** Calyx tubular, 5–10-nerved, and with 5 or 10 awl-shaped teeth.

* * Stamens exserted beyond the corolla-tube.

+ Stamens 4, the upper (inner) pair longer than the lower, ascending or diverging; corolla 2-lipped; the upper lip concave or arched, the lower spreading; calyx mostly 15-nerved.

++ Anthers not approximate in pairs; their cells parallel or nearly so.

7. **Agastache.** Stamens divergent, exserted; upper pair declined, lower ascending.
8. **Meehania.** Stamens all ascending, not exceeding the lip of the corolla.

++ ++ Anthers more or less approximate in pairs; their cells divaricate or divergent; filaments ascending, not exserted.

9. **Nepeta.** Calyx more or less curved, equally 5-toothed.
10. **Dracocephalum.** Calyx straight, the uppermost tooth much the largest.

+ + Stamens 4, parallel and ascending under the galeate or concave upper lip, the lower (outer) pair longer (except in nos. 14 and 17); calyx 5–10-nerved, not 2-lipped (except in no. 11).

++ Calyx reticulate-veiny, deeply bilabiate, closed in fruit.

11. **Prunella.** Calyx nerved and veiny; upper lip flat, 3-toothed, the lower 2-cleft.

++ ++ Calyx thin, inflated in fruit, obscurely nerved, 3–5-lobed, open.

12. **Physostegia.** Calyx 5-toothed or 5-lobed. Anther-cells parallel.
13. **Synandra.** Calyx almost equally 4-lobed! Anther-cells widely divergent.

++ ++ ++ Calyx of firmer texture, distinctly 5–10-nerved or -striate, 5–10-toothed.

= Stamens not deflexed after anthesis; naturalized from the Old World.

14. **Phlomis.** Calyx tubular, the 5 teeth abruptly awned. Upper lip of the corolla arched.
15. **Galeopsis.** Calyx tubular-bell-shaped, the 5 teeth spiny-pointed. Anthers transversely 2-valved, the smaller valve ciliate.
16. **Lamium.** Calyx-teeth not spiny-pointed. Nutlets sharply 3-angled, truncate.
17. **Leonurus.** Calyx top-shaped, the rigid spiny-pointed teeth soon spreading. Nutlets truncate and acutely 3-angled at top. Leaves cleft or incised.
18. **Ballota.** Calyx somewhat funnel-form, expanding above into a spreading 5-toothed border. Nutlets roundish at top. Upper lip of the corolla erect.

= = Stamens often deflexed or contorted after anthesis.

19. **Stachys.** Calyx tubular-bell-shaped, equally 5-toothed or the 2 upper teeth united into 1. Nutlets rounded at top.

+ + + Stamens 2, ascending and parallel; anthers apparently or really 1-celled; corolla strongly 2-lipped.

20. **Salvia.** Calyx 2-lipped. Anthers with a long connective astride the filament, bearing a linear cell at the upper end, and none or an imperfect cell on the lower.
21. **Monarda.** Calyx tubular and elongated, equally 5-toothed. Anthers of 2 cells confluent into 1, the connective inconspicuous.
22. **Blephilia.** Calyx ovoid-tubular, 2-lipped. Anthers as in the preceding.

← ← ← ← Upper pair of stamens shorter or wanting; anthers 2-celled; upper lip of corolla neither galeate nor concave.

++ Flowers in more or less crowded clusters or whorls, axillary or spicate.

— Corolla more or less 2-lipped.

a. Stamens (often only 2 in no. 23) ascending or arcuate, often more or less converging (or ascending parallel under the erect upper lip in no. 25).

23. **Hedeoma.** Calyx gibbous on the lower side, hairy in the throat. Flowers loose.
24. **Melissa.** Calyx tubular-bell-shaped, flattish on the upper side. Corolla curved upward.
25. **Satureja.** Calyx bell-shaped or tubular, 10–13-nerved. Tube of corolla straight.

b. Stamens distant and straight, often divergent, never convergent nor curved.

1. Stamens 4; calyx 10–15-nerved, hairy in the throat (except no. 26).

26. **Hyssopus.** Calyx tubular, 15-nerved, equally 5-toothed. Stamens exserted.
27. **Origanum.** Calyx ovoid-bell-shaped, 5-toothed. Spikes with large colored bracts.
28. **Pycnanthemum.** Calyx ovoid or short-tubular, equally 5-toothed or somewhat 2-lipped. Flowers in dense heads or clusters.
29. **Thymus.** Calyx ovoid, nodding in fruit, 2-lipped. Bracts minute. Leaves very small.

2. Stamens 2, with or without rudiments of the upper pair.

30. **Cunila.** Calyx very hairy in the throat, equally 5-toothed. Corolla small.

— — Corolla not evidently 2-lipped, but almost equally 4-lobed, small; stamens erect, distant.

31. **Lycopus.** Fertile stamens 2; often also 2 sterile filaments without anthers.
32. **Mentha.** Fertile stamens 4, nearly equal.

++ ++ Flowers in loose terminal panicled racemes; calyx 2-lipped, enlarged and declined in fruit.

33. **Collinsonia.** Lower lobe of corolla fimbriate, much the larger. Stamens 2.
34. **Perilla.** Corolla short, the lower lobe little larger. Stamens 4, included.

++ ++ ++ Flowers in dense spikes; calyx hardly 2-lipped, the teeth equal.

35. **Elsholtzia.** Corolla slightly 2-lipped. Stamens 4, exserted.

1. ÁJUGA L. Bugle Weed

884. A. genevensis. Inflorescence × ½. Flower × 1½.

Calyx 5-toothed. The large and spreading lower lip of the corolla with the middle lobe emarginate or 2-cleft. Stamens as in *Teucrium*, but anther-cells less confluent. (From α- privative, and ζυγόν, — Latin *jugum*, —*yoke*, from the seeming absence of a yoke-fellow to the lower lip of the corolla.)

1. A. réptans L. *Perennial*, 1–2.5 dm. high, smooth or but slightly pubescent, *with* copious *creeping stolons*; leaves obovate or spatulate, sometimes sinuate, the cauline sessile, the floral approximate, subtending several sessile blue flowers. — Locally in fields, Me. and Que. to s. N. Y. May–July. (Nat. from Eu.)

2. A. genevénsis L. Similar; the stems copiously soft-pubescent, *tufted*, *not stoloniferous*; leaves somewhat pubescent; flowers larger. — Locally in fields, waste places, etc., N. E., N. Y., and Pa. (Introd. from Eu.) Fig. 884.

2. TEÙCRIUM [Tourn.] L. Germander

Calyx 5-toothed. Corolla with the 4 upper lobes nearly equal, oblong, turned forward, so that there seems to be no upper lip; the lower lobe much larger. Stamens 4, exserted from the deep cleft between the 2 upper lobes of the corolla; anther-cells confluent. (Named for *Teucer*, king of Troy.)

* *Perennials; leaves merely dentate or serrate; inflorescences terminal, spiciform.*

← *Inflorescence cylindric; calyx densely pubescent.*

1. T. canadénse L. (American G., Wood Sage.) *Stems* 1 m. or less high, *appressed-pubescent*, simple or branched; *leaves lanceolate to ovate*, serrate, 2.5–5 cm. broad, rounded or narrowed at base, short-petioled, hoary beneath, *green and glabrous or sparingly appressed-pubescent but scarcely papillose above*; whorls about 6-flowered, crowded in long and simple wand-like racemes; *calyx canescent-pannose*, the 3 upper lobes very obtuse, or the middle one acutish; corolla 1.5–2 cm. long, purplish, pink, or sometimes cream-color. — Rich low ground, N. E. to Neb., and southw. July–Sept.

Var. littoràle (Bicknell) Fernald. *Stiff*, usually simple, 2–7 dm. high; *leaves lanceolate to lance-ovate*, 1.5–3 cm. broad, mostly tapering at base, *thick* and somewhat rugose, *the upper surface papillose beneath the dense appressed pubescence*; flowers slightly smaller. (*T. littorale* Bicknell.) — Near the coast, Me. to Fla. and Tex., and northw. in the Miss. basin to Okla.

2. T. occidentàle Gray. *Stem villous*, 3–9 dm. high; *leaves lance- to ovate-oblong*, white-villous beneath; *calyx and bracts villous with viscid hairs and with shorter capitate or stipitate glands*; the upper calyx-lobes acute or the middle one acuminate; corolla 8–12 mm. long. — Alluvial soil, Me. to B. C., s. to Pa., O., Mo., N. Mex., and Cal.

Var. boreàle (Bicknell) Fernald. Stem more closely pubescent; calyx and bracts with few or no capitate glands amongst the often viscid hairs; corolla slightly longer. (*T. boreale* Bicknell.) — Similar situations, n. N. H. to Wash., s. to w. N. Y., Ill., and Tex.

← ← *Inflorescence secund; calyx glabrous or glabrate.*

3. T. Scorodònia L. (Wood Sage, Germander Sage.) Stems ascending from a freely creeping rootstock, villous, 2–5 dm. high, simple or with few erect branches; leaves deltoid-lanceolate to -ovate, crenate, rugose, cordate or truncate at base, short-petioled; flowers pale yellow, paired in slender 1-sided racemes; upper tooth of the calyx large and recurved. — Said to be established in Ont. and O. (Adv. from Eu.)

* * *Annual; leaves pinnatifid; flowers in axillary verticels.*

4. T. bòtrys L. (Cut-leaf G.) Erect or decumbent, 1–3 dm. high; leaves long-petioled, rhombic-ovate, 1–2 cm. long, divided into few linear or oblong segments; flowers slender-pediceled; corolla reddish-purple; calyx gibbous-campanulate, the lower side saccate, the subequal deltoid teeth short. — Dry pastures, waste places, etc, local, w. Mass. to Ont. and O. (Nat. from Eu.)

3. ISÀNTHUS Michx. False Pennyroyal

885. I. brachiatus ×½.

Calyx equally 5-lobed, enlarged in fruit. Corolla little longer than the calyx; the border bell-shaped, with obovate lobes. Stamens slightly didynamous, incurved-ascending, scarcely exceeding the corolla. — A low much branched annual, clammy pubescent, with nearly entire lance-oblong 3-nerved leaves, and small pale blue flowers on axillary 1–3-flowered peduncles. (Name from ἴσος, *equal*, and ἄνθος, *flower*, referring to the almost regular corolla.)

1. I. brachiàtus (L.) BSP. Corolla 5 mm. long, little exceeding the calyx. (*I. caeruleus* Michx.) — Dry or sterile ground, Vt. and w. Que. to Minn., and southw. July, Aug. Fig. 885.

4. TRICHOSTÈMA L. Blue Curls

Calyx bell-shaped, deeply 5-cleft; the 3 upper teeth elongated and partly united, the 2 lower very short. Stamens with very long curved capillary fila

ments; anther-cells divergent and at length confluent. — Low annuals, somewhat clammy-glandular and balsamic, branched, with entire leaves, and mostly solitary 1-flowered pedicels terminating the branches, becoming lateral by the production of axillary branchlets, and the flower appearing to be reversed, namely, the short teeth of the calyx upward, etc. Corolla blue, varying to pink, rarely white, small; fl. in summer and autumn. (Name composed of *θρίξ*, *hair*, and *στῆμα*, *stamen*, from the capillary filaments.)

886. T. dichotomum × ½.

1. T. dichótomum L. (Bastard Pennyroyal.) Viscid with rather minute pubescence; *leaves lance-oblong or rhombic-lanceolate*, rarely lance-linear, short-petioled; lower lobe of the corolla oblong, longer than the remaining broader ones. — Sandy fields, Me. and Vt. to Ky., Mo., and Tex. Fig. 886.

2. T. lineàre Walt. Puberulent, more slender and less forked; *leaves linear*, nearly smooth. — In sandy ground near the coast, Ct. to La.

5. SCUTELLÀRIA L. Skullcap

Calyx bell-shaped in flower, splitting to the base at maturity, the lips entire, the upper usually falling away. Corolla with an elongated curved ascending tube, dilated at the throat; the upper lip entire or barely notched, the lateral lobes mostly connected with the upper rather than the lower lip; the lower lobe or lip spreading and convex, notched at the apex. Stamens ascending under the upper lip; anthers approximate in pairs, ciliate or bearded, those of the lower stamens 1-celled (halved), of the upper 2-celled and heart-shaped. — Bitter perennial herbs, not aromatic, the short peduncles or pedicels chiefly opposite, 1-flowered, often 1-sided, axillary or spiked or racemed; fl. in summer. (Name from *scutella*, a dish, in allusion to the appendage of the fruiting calyx.)

§ 1. *Nutlets wingless, mostly marginless, on a low gynobase.*

* *Flowers small* (5–8 *mm. long*), *in axillary and sometimes terminal* 1-*sided racemes.*

1. S. lateriflòra L. (Mad-dog S.) Smooth; stem upright, much branched, 1–8 dm. high; leaves lanceolate-ovate or ovate-oblong, pointed, coarsely serrate, rounded at base, petioled, 3–9 cm. long, the lower floral ones similar; flowers blue, rarely pink or white. — Wet shaded places, common. July–Sept.

* * *Flowers solitary in the axils of the upper leaves or in terminal single or panicled racemes; the floral leaves mostly smaller than the cauline.*

— *Flowers* 1–3 *cm. long; principal stem-leaves more than* 2 *cm. long.*

— *Stem-leaves all cordate, crenate-toothed, slender-petioled; lateral lobes of the corolla almost equaling the short upper lip.*

887. S. versicolor × ½.

2. S. versícolor Nutt. *Soft-hairy*, the hairs of the inflorescence, etc., partly viscid-glandular; stem mostly erect, 3–9 dm. high; *leaves ovate or round-ovate*, very veiny, *rugose*, the floral reduced to broadly ovate subentire bracts about equaling the glandular-hairy calyx; racemes mostly simple; corolla bright blue, with lower side and lip whitish. (*S. cordifolia* Muhl.?, *nomen subnudum.*) — Banks of streams, Pa. to Wisc., Minn., and southw. June, July. Fig. 887.

3. S. saxátilis Riddell. *Glabrous or slightly hairy;* stem weak, ascending, 1–5 dm. long, often producing runners, branched; *leaves ovate or ovate-oblong*, 1.5–5 cm. long, *thin, obtuse;* upper bracts oblong or ovate, small,

entire; raceme simple, loose. — Moist shaded banks, Del. to O., s. in the mts. to Va. and Tenn. June, July.

→ → *Stem-leaves if slender-petioled not cordate (or only the very lowest sometimes so); lateral lobes of the usually violet-blue corolla shorter than the galeate upper lip.*

= *Stem-leaves crenate-dentate or serrate.*

a. Stem-leaves on distinct petioles (8 mm. or more long).

1. *Flowers in terminal single or panicled racemes; the floral leaves gradually reduced to entire inconspicuous bracts.*

4. **S. serràta** Andr. *Green and nearly glabrous;* stem rather simple, 2.5–7 dm. high, with single loosely flowered racemes; *leaves serrate, acuminate at both ends*, ovate or ovate-oblong; calyx, etc., somewhat hairy; *corolla 2–2.5 cm. long, slender, its lips equal* in length. — Woods, N. Y. and Pa. to Ill. and N. C. May, June.

5. **S. canéscens** Nutt. Stem branched above, 0.5–1.2 m. high, with the *panicled many-flowered racemes, flowers, and the lower surface of the ovate or lance-ovate acute* (at the base acute, obtuse, or cordate) *crenate leaves whitish with fine soft down*, often becoming rather glabrous; bracts oblong or lanceolate; *corolla 2 cm. long.* (*S. incana* Muhl.?, *nomen subnudum.*) — Woods and river-banks, Pa. to s. Ont., Mich., and southw. July–Aug.

6. **S. pilòsa** Michx. *Pubescent with spreading hairs;* stem nearly simple, 2–7 dm. high; *leaves rather distant, crenate, oblong-ovate, obtuse*, varying to roundish-ovate, 2–5 cm. long, the lower abrupt or heart-shaped at base and long-petioled, the upper on short margined petioles, veiny; bracts oblong-spatulate; racemes short, often branched; *corolla 1.2–1.7 cm. long, rather slender*, the lower lip a little shorter. — Dry or sterile ground, s. N. Y. to Mich., s. to Fla. and Tex. May, June.

Var. **hirsùta** (Short) Gray. A large form (8–9 dm. high), more hirsute, with larger very coarsely crenate leaves. — Richer soil, Ky. and Va.

2. *Flowers mostly borne on elongate branches even from the base of the plant, solitary in the axils of mostly dentate leaves.*

7. **S. Churchilliàna** Fernald. Stems ascending from a slender rootstock, 3.5–6 dm. high, minutely pilose, freely branching; the branches simple or forked, flexuous, mostly 1.5–3 dm. long; leaves ovate-acuminate, thin, glabrous above, minutely pilose on the nerves beneath, those of the primary stem 4–6 cm. long, crenate-dentate, those of the branchlets smaller (1.5–3.5 cm. long); corolla 1–1.5 cm. long, slender-funnel-form, gradually enlarged upward. — Alluvial soil, N. B. and Me. July–Sept.

b. Stem-leaves subsessile or on short petioles (1–4 mm. long).

8. **S. galericulàta** L. *Herbaceous; subterranean stolons not tuberiferous;* smooth or a little downy, erect, 1–9 dm. high; leaves ovate-lanceolate or oblong, acute, serrate, roundish and slightly heart-shaped at base, 1.5–6 cm. long; flowers solitary in the axils of the upper leaves; corolla violet-blue, 1.7–2.2 cm. long, with slender tube, the large lower lip nearly erect. — Wet places, Nfd. to B. C., s. to N. C., O., and Neb. June–Aug.

= = *Stem-leaves (or all but the lowest) entire.*

9. **S. integrifòlia** L. *Downy all over with a minute hoariness; stems solitary* and commonly simple, 3–8 dm. high, *from a slender base; upper leaves oblong-lanceolate, mostly entire*, obtuse, very short-petioled, *the lowest long-petioled, ovate, dentate;* flowers in the axils of the upper more or less reduced leaves or in terminal single or panicled racemes; *corolla 2–2.5 cm. long, much enlarged above, the ample lips subequal* in length. — Moist ground, e. Mass. to Fla. and Tex., chiefly near the coast. May–July.

10. **S. Búshii** Britton. *Stems numerous, from a short ligneous caudex*, 1.5–3 dm. high, closely puberulent; *leaves uniform*, oblanceolate, obtuse, *all entire;* flowers axillary, along the upper two thirds of the stem; corolla 2–2.5 cm. long. — Barrens, s. Mo. May, June.

+ + *Flowers 5–10 mm. long; leaves at most 2 cm. long.*

11. **S. pàrvula** Michx. Herbaceous; *subterranean stolons moniliform-tuberiferous;* pubescent throughout with spreading often viscid hairs, dwarf (0.8–3 dm. high), branched and spreading; all but the lower leaves sessile and entire or sparingly toothed, the lowest round-ovate, the others ovate or lance-ovate, slightly heart-shaped; flowers axillary. (Including var. *mollis* Gray; *S. campestris* Britton.) — Sandy banks, Vt. and w. Que. to Mich., s. to Tenn. and Tex. Apr.–July.

888. S. nervosa. An upper node × ½. Nutlet × 5.

Var. **ambígua** (Nutt.) Fernald. Minutely puberulent or glabrate. (*S. parvula* Britton, not Michx.) — Me. to Wisc., Ky., and Tex.

§ 2. *Nutlets conspicuously winged, each raised on a slender base.*

12. **S. nervòsa** Pursh. Smooth, simple or branched, slender, 1.5–5 dm. high; lower leaves roundish, the middle ovate, toothed, somewhat heart-shaped, 2–4.5 cm. long, the floral ovate-lanceolate, entire; nerve-like veins prominent beneath; corolla bluish, 1 cm. long, the lower lip exceeding the concave upper one. — Moist thickets and rich woods, s. Ont. and N. Y. to Mo. and N. C. Fig. 888.

6. MARRÙBIUM [Tourn.] L. Horehound

Calyx-teeth more or less spiny-pointed and spreading at maturity. Upper lip of the corolla erect, notched, the lower spreading, 3-cleft, its middle lobe broadest. Stamens 4. — Whitish-woolly bitter-aromatic perennials, branched at the base, with rugose and crenate or cut leaves, and many-flowered axillary whorls (A name used by Pliny, from the Hebrew *marrob*, a bitter juice.)

1. **M. vulgàre** L. (Common H.) Stems ascending; leaves round-ovate, petioled, crenate-toothed; whorls capitate; calyx with 10 recurved teeth, the alternate ones shorter; corolla small, white. — Waste places, Me. to Ont., westw. and southw. June–Aug. (Nat. from Eu.) Fig. 889.

889. M. vulgare. Node × ½. Fruiting calyx × 2.

7. AGÁSTACHE Clayt. Giant Hyssop

Calyx tubular-bell-shaped, 15-nerved, oblique, 5-toothed, the upper teeth rather longer than the others. Upper lip of corolla nearly erect, 2-lobed, the lower 3-cleft, with the middle lobe crenate. Stamens 4, exserted; the upper pair declined, the lower and shorter pair ascending, so that the pairs cross; anther-cells nearly parallel. — Perennial tall herbs, with petioled serrate leaves, and small flowers crowded in interrupted terminal spikes in summer. (From ἄγαν, *much*, and στάχυς, *an ear of corn*, in reference to the numerous spikes.) Lophanthus Benth., in part.

890. A. scrophulariaefolia. Node and spike × ½. Flower × 2.

1. **A. nepetoìdes** (L.) Ktze. Stem stout, 0.7–1.5 m. high, sharply 4-angled, *smooth* or nearly so; leaves ovate, somewhat pointed, coarsely crenate-toothed, 5–12 cm. long; spikes 3–12 cm. long, crowded with the ovate pointed bracts; *calyx-teeth ovate, rather obtuse, little shorter than the pale greenish-yellow corolla.* (*Lophanthus* Benth.) — Borders of woods, e. Mass., Vt., and w. Que. to Minn., and southw.

2. **A. scrophulariaefòlia** (Willd.) Ktze. Stem (obtusely 4-angled) and lower surface of the ovate or somewhat heart-shaped acute leaves slightly *pubescent;*

spikes 0.5–5 dm. long; *calyx-teeth lanceolate, acute, shorter than the purplish corolla;* otherwise like the preceding. (*Lophanthus* Benth.) — N. H. to Ont., Mo., Ky., and Va. Fig. 890. Var. MÓLLIS (Fernald) Heller. Stems and lower surfaces of leaves densely villous. — Vt. and Ct. to Ill.

3. A. Foeniculum (Pursh) Ktze. Smooth, but the ovate acute *leaves glaucous-white underneath* with minute down; *calyx-teeth lanceolate, acute.* (*Lophanthus anisatus* Benth.; *A. anethiodora* Britton.) — Plains, L. Superior and Man. to Neb., and westw. — Foliage with the scent of anise.

8. MEEHÀNIA Britton.

Calyx rather obliquely 5-toothed, 15-nerved. Corolla ample, expanded at the throat; the upper lip flattish or concave, 2-lobed, the lower 3-cleft, the middle lobe largest. Stamens 4, ascending, the lower pair shorter; anther-cells parallel. — Low stoloniferous herb, with pale purplish flowers. (Named for the late *Thomas Meehan*, Philadelphian botanist.)

1. M. cordàta (Nutt.) Britton. Low, with slender runners, hairy; leaves broadly heart-shaped, crenate, petioled, the floral shorter than the calyx; whorls few-flowered, at the summit of short ascending stems; corolla hairy inside, 2–3.5 cm. long; stamens shorter than the upper lip. (*Cedronella* Benth.) — Moist shady banks, w. Pa. to Ill., Tenn., and N. C. June.

9. NÉPETA L. Cat Mint

Calyx tubular, often incurved. Corolla dilated in the throat; the upper lip erect, rather concave, notched or 2-cleft; the lower 3-cleft, the middle lobe largest, either 2-lobed or entire. — Perennial herbs. (The Latin name, thought to be derived from *Nepete*, an Etruscan city.)

§ 1. CATÀRIA [Tourn.] Reichenb. *Cymose clusters rather dense and many-flowered, forming interrupted spikes or racemes; upper floral leaves small and bract-like.*

1. N. Catària L. (Catnip.) Downy, erect, branched; leaves heart-shaped, oblong, deeply crenate, whitish-downy underneath; corolla whitish, dotted with purple. — Near dwellings; a common weed. July–Sept. (Nat. from Eu.)

891. N. hederacea.
Node × ½.
Longitudinal section of flower × 2.

§ 2. GLECHÒMA (L.) Benth. *Leaves all alike; the axillary clusters loosely few-flowered.*

2. N. hederàcea (L.) Trevisan. (Ground Ivy, Gill-over-the-Ground.) Creeping and trailing; leaves petioled, round-kidney-shaped, crenate, green both sides; corolla thrice the length of the calyx, light blue. (*Glecoma* L.; *N. Glechoma* Benth.) — Damp or shady places, near towns. May–July. (Nat. from Eu.) Fig. 891.

10. DRACOCÉPHALUM [Tourn.] L. Dragon Head

Calyx tubular, 13–15-nerved, 5-toothed. Upper lip of the corolla slightly arched and notched; the lower 3-cleft, with its middle lobe largest and 2-cleft or notched at the end. — Whorls many-flowered, mostly spiked or capitate, and with awn-toothed or fringed leafy bracts. (Name from δράκων, *a dragon*, and κεφαλή, *head*, alluding to the form of the corolla in the original species.)

1. D. parviflòrum Nutt. Annual or biennial; stem erect, leafy, 1.5–8 dm. high; leaves ovate-lanceolate, sharply cut-toothed, petioled; whorls crowded in a terminal head or spike; upper tooth of the calyx ovate, nearly equaling

892. D. parviflorum. Inflorescence × ½. Fruiting calyx × 2.

the small slender bluish corolla. — Rocky or gravelly calcareous soil, chiefly in recent clearings, e. Que. to Yukon, southw. to n. and w. N. Y., Mich., Wisc., Ia., N. Mex., and Ariz.; occasionally adventive in N. E. June–Aug. Fig. 892.

11. PRUNÉLLA L. Self-heal

Calyx tubular-bell-shaped, somewhat 10-nerved, naked in the throat, closed in fruit; upper lip broad, truncate. Corolla ascending, slightly contracted at the throat and dilated at the lower side just beneath it, 2-lipped; upper lip erect, arched, entire; the lower reflexed-spreading, 3-cleft, its lateral lobes oblong, the middle one rounded, concave, denticulate. Filaments 2-toothed at the apex, the lower tooth bearing the anther; anthers approximate in pairs, their cells diverging. — Low perennials, with nearly simple stems, and 3-flowered clusters of flowers sessile in the axils of round and bract-like membranaceous floral leaves, imbricated in a close spike or head. (Name said to be from the German *Bräune*, a disease of the throat, for which this plant was a reputed remedy. Often written *Brunella*, which was a pre-Linnean form.)

1. P. vulgàris L. (Heal-all, Carpenter-weed.) Leaves ovate-oblong, entire or toothed, petioled, hairy or smoothish; corolla violet or flesh-color, rarely white, not twice the length of the purplish calyx. — Woods and fields, Nfd. to Fla., westw. across the continent. June–Sept. (Eu.) Var. laciniàta L. Some upper leaves tending to be pinnatifid. (*P. laciniata* L.) — Said to be introd. near Washington, D. C. (Adv. from Eu.)

12. PHYSOSTEGIA Benth. False Dragon Head

Calyx obscurely 10-nerved, short-tubular or bell-shaped, more or less enlarged and slightly inflated in fruit. Corolla funnel-form, with a much inflated throat, 2-lipped; upper lip erect, nearly entire; the lower 3-parted, spreading, small, its middle lobe larger, broad and rounded, notched. — Smooth perennials, with upright wand-like stems, and sessile lanceolate or oblong mostly serrate leaves. Flowers large and showy, rose or flesh-color variegated with purple, opposite, crowded in simple or panicled terminal leafless spikes. (Name from φῦσα, *a bladder*, and στέγη, *a covering*, in allusion to the calyx, which is at length somewhat inflated.)

* *Stem conspicuously leafy up to the inflorescence.*

1. P. virginiàna (L.) Benth. Stem 0.5–1.3 m. high, terminated by a simple virgate spike or several panicled spikes; leaves thickish, mostly sharply serrate; *calyx tubular-campanulate, its teeth half the length of the tube, acuminate, at length acerose-tipped; corolla* 1.8–2.3 *cm. long.* — Wet grounds, from w. Que. westw. and southw.; frequently escaped from cultivation in e. N. E. June–Sept. Fig. 893.

P. parviflòra Nutt. Stem 2–6 dm. high, simple to the inflorescence; leaves thin, lanceolate, denticulate to serrate; spikes short and dense; *calyx-teeth* short and *blunt; corolla* 1–1.5 *cm. long.* — Wet banks, Wisc. to Sask., N. Dak., and westw. July–Sept.

893. P. virginiana. Leaf and bit of spike × ⅔. Anther × 3.

* * *Stem-leaves greatly reduced upward, the inflorescences long-pedunculate.*

3. **P. denticulàta** (Ait.) Britton. Slender, simple, or the inflorescence branched, 0.6–1.2 dm. high; leaves thick, pale green, from creuate-dentate to serrate; spikes solitary or in large plants several and paniculately disposed, rather loose; *corolla* 2.5–3.5 *cm. long.* (*P. virginiana*, var. Gray.) — Prairies, river-banks, etc., Va. to Ill., Kan., and southw. June–Aug.

4. **P. intermèdia** (Nutt.) Engelm. & Gray. Slender, 3–15 dm. high, remotely leaved; leaves linear-lanceolate, repand-denticulate; *rhachis filiform*, rather remotely flowered; *calyx short and broadly campanulate; corolla* 1–1.5 *cm. long, much dilated upward.* — Barrens, w. Ky. and Ark. to La. and Tex.

13. SYNÁNDRA Nutt.

Calyx bell-shaped, inflated, membranaceous, irregularly veiny. Corolla with a long tube, much expanded above and at the throat; the upper lip slightly arched, entire, the lower spreading and 3-cleft, with ovate lobes, the middle one broadest and notched at the end. Filaments hairy; anthers approximate in pairs under the upper lip; the two upper each with one fertile and one smaller sterile cell, the latter cells cohering together (whence the name; from *σύν*, *together*, and *ἀνήρ*, for *anther*).

1. **S. hispídula** (Michx.) Britton. Hairy biennial, 3–6 dm. high; lower leaves long-petioled, broadly ovate, heart-shaped, crenate, thin, the floral sessile, gradually reduced to bracts, each with a single sessile flower; corolla 3–4 cm. long, yellowish-white. (*S. grandiflora* Nutt.) — Shady banks of streams, O. to Ill., Tenn., and Va. June.

14. PHLÒMIS [Tourn.] L. Jerusalem Sage

Upper lip of the corolla arched; the lower spreading, 3-cleft. Stamens ascending under the upper lip; the filaments of the upper pair longer than the others in *P. tuberosa*, with an awl-shaped appendage at base; anther-cells divergent and confluent. — Leaves rugose. Whorls dense and many-flowered, axillary, remote, bracted. (An old Greek name of a woolly plant.)

1. **P. tuberòsa** L. Tall perennial, nearly smooth; leaves ovate-heart-shaped, crenate, petioled, the floral oblong-lanceolate; bracts awl-shaped, hairy; upper lip of the purple corolla densely bearded with white hairs on the inside. — Shore of L. Ontario, N. Y., local. June, July. (Nat. from Eu.)

15. GALEÓPSIS L. Hemp Nettle

Calyx about 5-nerved, with 5 somewhat equal teeth. Corolla dilated at the throat; upper lip ovate, arched, entire; the lower 3-cleft, spreading, the lateral lobes ovate, the middle one inversely heart-shaped; palate with 2 teeth at the sinuses. — Annuals, with spreading branches, and several–many-flowered whorls in the axils of floral leaves which are nearly like the lower ones. (Name composed of *γαλέη*, *a weasel*, and *ὄψις*, *appearance*, from some fancied likeness of the corolla to the head of a weasel.)

1. **G. Tetràhit** L. (Common H.) *Stem swollen below the joints, bristly-hairy; leaves ovate*, coarsely serrate; corolla purplish, white, or variegated, about twice the length of the calyx. — Waste places and fields, common. June–Sept. (Nat. from Eu.)

2. **G. Ládanum** L. (Red H.) *Stem canescent with appressed pubescence; leaves linear or lanceolate*, more or less downy, entire or obscurely serrate; corolla red or rose-color (often spotted with yellow), much exceeding the calyx. — Ballast and waste places, N. B. to Mich. and N. J., local. (Adv. from Eu.) Var. latifòlia Wallr *Leaves ovate-oblong, sharply toothed;* upper parts of the *plant copiously glandular.* — Similar places, casual. (Adv. from Eu.)

16. LÀMIUM L. Dead Nettle

Calyx tubular-bell-shaped, about 5-nerved, with 5 nearly equal awl-pointed teeth. Corolla dilated at the throat; upper lip ovate or oblong, arched, narrowed at the base; the middle lobe of the spreading lower lip broad, notched at the apex, contracted as if stalked at the base; the lateral ones small, at the margin of the throat. — Decumbent herbs, the lowest leaves small and long-petioled, the middle heart-shaped and doubly toothed, the floral subtending the whorled flower-cluster. (Name from λαιμός, *throat*, in allusion to the ringent corolla.)

* *Annuals or biennials, low; flowers small, purplish, at most* 1.5 *cm. long.*

1. L. amplexicaúle L. (Henbit.) *Leaves* rounded, deeply crenate-toothed or cut, the *upper ones clasping;* corolla elongated, upper lip bearded, the lower spotted, lateral lobes truncate. — Waste and cultivated places. Apr.–Oct. (Nat. from Eu.)

2. L. purpùreum L. *Leaves* roundish or oblong, heart-shaped, crenate-toothed, *all petioled.* — N. E. to N. C. Apr., May. (Nat. from Eu.)

* * *Perennial, taller; flowers larger.*

894. L. album × ½.

3. L. álbum L. Hairy; leaves ovate, heart-shaped, petioled; calyx-teeth very slender, spreading; *corolla white, the tube curved upward, obliquely contracted near the base, where there is a ring of hairs inside;* lateral lobes of lower lip bearing a long slender tooth. — Roadsides and waste places, mostly escaped from cultivation. May–July. (Introd. from Eu.) Fig. 894.

4. L. maculàtum L. Like the last, but *leaves* more frequently *marked with a white spot* on the upper face, and *flowers purplish* or white, *with the ring of hairs transverse* instead of oblique. — Sparingly escaped to roadsides and thickets. May–July. (Introd. from Eu.)

17. LEONÙRUS L. Motherwort

Calyx 5-nerved, with 5 nearly equal teeth. Upper lip of the corolla oblong and entire, somewhat arched; the lower spreading, 3-lobed, its middle lobe larger, narrowly oblong-obovate, entire, the lateral ones oblong. — Upright herbs, with cut-lobed leaves, and close whorls of flowers in their axils; in summer. (Name from λέων, *a lion*, and οὐρά, *tail*, i.e. *Lion's-tail.*)

1. L. Cardìaca L. (Common M.) Tall perennial; *leaves long-petioled, the lower rounded, palmately lobed, the floral wedge-shaped at base, subentire or 3-cleft*, the lobes lanceolate; *upper lip of* the pale purple *corolla bearded.* — Waste places, around dwellings. (Nat. from Eu.)

2. L. Marrubiástrum L. Tall biennial, with elongated branches; *stem-leaves oblong-ovate, coarsely toothed; corolla* whitish, shorter than the calyx-teeth, the *tube naked within;* lower lip rather erect. — Waste places, etc., Pa. and Del. (Adv. from Eu.)

3. L. sibíricus L. Tall biennial; *leaves 3-parted, the divisions 2–5-cleft, or deeply 3–7-cleft and incised;* corolla purplish, twice as long as the calyx, the upper lip fornicate, the lower little spreading. — Waste grounds, Pa. and Del. (Adv. from Eurasia.)

18. BALLÒTA L. Fetid Horehound

Calyx nearly funnel-form; the 10-ribbed tube expanded above into a spreading regular border, with 5–10 teeth. Anthers exserted beyond the tube of the corolla, approximate in pairs. Otherwise much as in *Marrubium.* (The Greek name, of uncertain origin.)

1. B. NÌGRA L. (BLACK HOREHOUND.) More or less hairy, but green, erect; the root perennial; leaves ovate, toothed; whorls many-flowered, dense; calyx-teeth 5, longer than the tube of the purplish corolla. — Waste places. N. E., Pa. etc., rare. (Nat. from Eu.)

19. STÀCHYS [Tourn.] L. HEDGE NETTLE

Corolla not dilated at the throat; upper lip erect or rather spreading, often arched, entire or nearly so; the lower usually longer and spreading, 3-lobed, with the middle lobe largest and nearly entire. Stamens 4, ascending under the upper lip (often reflexed on the throat after flowering); anthers approximate in pairs. Nutlets obtuse, not truncate. — Whorls 2–many-flowered, approximate in a terminal raceme or spike (whence the name, from στάχυς, *a spike*).

a. Annuals.
  Stem smoothish; corolla yellow, much exceeding the calyx . . . 1. *S. annua.*
  Stem hirsute; corolla purplish, about equaling the calyx . . . 2. *S. arvensis.*
a. Perennials *b.*
  b. Stems glabrous on the sides, smooth or bristly on the angles *c.*
    c. Calyx-teeth triangular-lanceolate, about equaling the tube.
      Leaves entire or obscurely toothed, linear or linear-oblong . . 3. *S. hyssopifolia*
      Leaves regularly serrate or serrulate.
        Leaves 5–13 mm. broad, their petioles 1–3 mm. long . . . 4. *S. ambigua.*
        Leaves broader, their petioles 5–15(-20) mm. long.
          Leaves rounded-truncate to cuneate at base, acute or merely acuminate at tip . . . . . 5. *S. tenuifolia.*
          Leaves heart-shaped at base, caudate-acuminate at tip . . 6. *S. Nuttallii.*
    c. Calyx-teeth broadly deltoid, much shorter than the tube . . . 7. *S. latidens.*
  b. Stems pubescent (or puberulent) on the sides as well as on the angles.
      Leaves linear to linear-lanceolate, 10–12 times as long as broad . . 8. *S. arenicola.*
      Leaves broader, oblong to cordate-ovate.
        Leaves subsessile or very short-petioled, the lower petioles not conspicuously longer than the upper . . . . . 9. *S. palustris.*
        Lower leaves on elongate petioles, the upper on shorter petioles or subsessile.
          Calyx-teeth broad-deltoid, much shorter than the tube . . 10. *S. cordata.*
          Calyx-teeth lanceolate, nearly equaling the tube . . . 11. *S. salvioides.*

1. S. ÁNNUA L. *Erect* smoothish *annual;* leaves oblong to oblanceolate, the lower crenate, the upper subentire; calyx pilose and glandular-puberulent, 6–8 mm. long, the subequal lanceolate lobes about equaling the tube; *corolla yellow,* 1.5 *cm. long.* — Waste places and ballast, chiefly about Atlantic ports. July, Aug. (Adv. from Eu.)

2. S. ARVÉNSIS L. Low *decumbent annual;* stems hirsute; leaves ovate, crenate, subcordate, hirsute, the lower long-petioled; *calyx* 4.5–6 mm. long, hirsute, *about equaling the purplish corolla.* — Waste places and ballast, chiefly near Atlantic ports. (Adv. from Eu.)

3. S. hyssopifòlia Michx. *Smooth and glabrous,* or the nodes hirsute; stems slender, 2–5 dm. high; *leaves linear-oblong or narrowly linear, sessile, entire or obscurely toothed toward the apex,* 2–5 *cm. long,* 3–10 *mm. wide;* whorls 4–6-flowered, rather distant; corolla twice or thrice the length of the triangular-awl-shaped spreading calyx-teeth. — Wet sandy places, Mass. to Fla.; s. Mich. July–Sept.

4. S. ambígua (Gray) Britton. Resembling the preceding, but stouter, with scattered *retrorse bristles on the angles of the stem,* and with *serrulate leaves about* 1 *cm. broad.* (*S. hyssopifolia,* var. Gray.) — Pa. to Wisc., and southw June–Aug.

5. S. tenuifòlia Willd. Rootstock slender; stem slender, *smooth and glabrous throughout,* or with few minute bristles on the angles; *leaves lanceolate to oblong, taper-pointed,* sharply toothed, mostly 5–10 cm. long, *short-petioled,* only the lower floral longer than the flowers; spike slender and interrupted; *calyx glabrous,* the tube rather slender, *the lance-subulate teeth somewhat spreading.* (*S. aspera,* var. *glabra* Gray.) — Wet ground, N. Y. to Ia., and southw.

Var. áspera (Michx.) Fernald. *Angles of the stem beset with long reflexed bristles; leaves* oblong- to ovate-lanceolate, short-petioled, *more or less hairy;*

calyx slightly larger, the *teeth often less spreading.* (*S. aspera* Michx.) — Vt. and e. Mass. to Ont., and southw. July, Aug.

6. **S. Nuttállii** Shuttlw. Tall, very hirsute on the angles; *leaves cordate-ovate to -oblong*, hirsute on the veins, serrate-dentate, *caudate-acuminate;* spike very interrupted, *the lower verticels borne in the axils of the short-petioled foliage leaves;* calyx hirsute, the spiny teeth nearly equaling the corolla-tube. — O. and Va. to Tenn.

7. **S. látidens** Small. *Stem* stout, 6–7 dm. high, *smooth*, or finely setose on the angles; leaves ovate-oblong, subcordate, glabrous or sparingly setulose, short-petioled, mostly 1–1.3 dm. long, 3–5 cm. broad, coarsely crenate-dentate; spike slender and interrupted, the lowest floral leaves large; *calyx* pubescent, short-campanulate, *with short deltoid firm teeth.* — Mts. of Va., N. C., and Tenn.

8. **S. arenícola** Britton. *Stem* 3–6 dm. high, *copiously retrorse-hispid* on the sides and angles; *leaves linear to linear-lanceolate*, 6–10 cm. long, 5–10 mm. wide, densely pubescent on both faces, crenate-serrate; spike dense, slightly interrupted; the lower bracts much exceeding the flowers, the upper short, all densely hispid; *calyx hispid, the lobes acicular;* corolla inconspicuous, the upper lip hispid. — Sandy soil, N. Y. to Ill. and Mich.

9. **S. palústris** L. (Woundwort.) Rootstock tuberous-thickened, freely stoloniferous; *stem* 3–10 dm. high, leafy, *hirsute on the angles with spreading or reflexed hairs, the sides more finely appressed-pubescent; leaves sessile, or the lower short-petioled, lanceolate to ovate-oblong, crenate-serrate*, rounded at base, *downy or hairy*, obtusish, 4–10 cm. long, only the uppermost floral ones shorter than the nearly sessile calyx; whorls 6–10-flowered, the upper crowded into an interrupted spike; calyx hispid, the lance-subulate teeth somewhat spiny, half the length of the corolla, diverging in fruit. — Wet ground, Nfd. to the Mackenzie, s. to N. C., O., Ill., Minn., Col., etc. (Eurasia.) Var. homótricha Fernald. *Sides of the stems and the angles almost uniformly hirsute* with long retrorse hairs. — N. B. to Ct., centr. N. Y., and westw.

10. **S. cordàta** Riddell. *Stem* rather weak, *long-hirsute on the angles*, 6–8 dm. high; *leaves long-petioled, all ovate- or oblong-cordate, acuminate, crenate*, 7–15 cm. long, the floral mostly minute; spikes slender, of numerous few-flowered clusters; *calyx small, with very short teeth;* corolla about 1 cm. long. — Thickets, s. O. to Va. and Tenn.

11. **S. salvioìdes** Small. *Stems closely glandular-puberulent to short-hirsute*, 3–9 dm. high; leaves petioled, the petioles glandular-short-hirsute, the closely pubescent cordate-ovate dentate acuminate blade 6–12 cm. long; spike slender, few-flowered; the bracts ovate, about equaling the calyx; *calyx-lobes* lance-deltoid, *about equaling the tube;* corolla about 1 cm. long. — Stony soil, Va. and W. Va. to Tenn.

20. SÁLVIA [Tourn.] L. Sage

Upper lip of calyx 3-toothed or entire, the lower 2-cleft. Corolla deeply 2-lipped, ringent; upper lip straight or scythe-shaped, entire or barely notched, the lower spreading or pendent, 3-lobed, its middle lobe larger. Stamens on short filaments, jointed with the elongated transverse connective, one end of which, ascending under the upper lip, bears a linear 1-celled (half-) anther, the other, usually descending, bears an imperfect or deformed (half-) anther or none at all. — Flowers mostly large and showy, in spiked, racemed, or panicled whorls. (Name from *salvare*, to save, in allusion to the reputed healing qualities of Sage.)

* *Both anther-cells polliniferous; leaves mostly lyrately lobed or pinnatifid.*

1. **S. lyràta** L. (Lyre-leaved S.) Low perennial, 2–6 dm. high, somewhat hairy; stem nearly simple and naked; root-leaves lyre-shaped or sinuate-pinnatifid, sometimes almost entire; those of the stem mostly a single pair, smaller and narrower; bracts oblong-linear, not longer than the calyx; whorls loose and distant, forming an interrupted raceme; upper lip of the blue-purple pubescent corolla (2–3 cm. long) short, straight, not vaulted. — Sandy woods and barrens, Ct. to Ill., s. to Fla. and Tex. May, June.

** *Lower anther-cell wanting; the sterile ends of the connectives mostly united.*

— *Calyx obscurely bilabiate; corolla* 1.5–2.5 *cm. long, with prominently exserted tube.*

2. **S. azùrea** Lam., var. **grandiflòra** Benth. Cinereous-puberulent, 0.5–1.5 m. high; lower leaves lanceolate or oblong, obtuse, denticulate or serrate, tapering to a short petiole; upper narrower, often linear, entire; inflorescence spike-like, tomentulose-sericeous; calyx-teeth short, the broad upper lip entire; corolla blue or white. (*S. Pitcheri* Torr.) — Minn. to Mo., westw. and southw. July–Sept.

— — *Calyx deeply bilabiate; corolla-tube hardly at all exserted.*

— *Annual.*

3. **S. lanceaefòlia** Poir. *Puberulent* or nearly glabrous, 1–12 dm. high; *leaves lanceolate or linear-oblong*, irregularly serrate or nearly entire, *tapering to a slender petiole;* inflorescence virgate-spiciform, interrupted; *upper lip of calyx entire*, lower 2-cleft; *corolla* blue, 1 cm. long, *little exserted; style glabrous or nearly so.* (*S. lanceolata* Broussonet, not Lam.) — Plains and open soil, Ind. (*C. P. Smith*) to Neb., Tex., and Ariz.; introd. at Columbus, O. (*Kellerman*). May–Oct.

— — *Perennials.*

= *Pedicels about equaling the fruiting calyx.*

4. **S. urticifòlia** L. *Villous-pubescent and somewhat viscid*, or glabrate, 3–6 dm. high; *leaves* coarsely serrate, *ovate, with truncate or cuneate base decurrent into a winged petiole;* inflorescence racemose-spicate, of numerous distant clusters; *calyx-lips* divergent, *the upper 3-toothed*, lower 2-cleft; *corolla* blue and white, 1–1.5 cm. long, *twice the length of the calyx; style strongly bearded.* — Woodlands, Pa. to Ky., s. to Ga. and La. May–July.

= = *Pedicels much shorter than the fruiting calyx.*

5. **S. Sclàrea** L. (Clary.) Villous-pubescent, viscid, stout, 1 m. or less high; *leaves ample, long-petioled, ovate and cordate*, crenate, rugose, *the floral forming large bracts* of the spike, tinged with white and rose-color; *corolla* white and bluish, rather *large, the long upper lip falcate and compressed.* — Escaped from gardens, from Pa. southw. (Introd. from Eu.)

6. **S. Verbenàca** L. Puberulent to villous, 3–6 dm. high; *leaves* ovate or oblong, *mostly sinuate-incised or moderately pinnatifid*, the lobes crenate-toothed, rugose, the few *cauline mostly sessile, the floral inconspicuous; spike interrupted;* calyx reflexed after flowering; corolla bluish, small, the upper lip nearly straight. — Sparingly in waste places, Middle and Southern States. (Nat. from Eu.)

21. MONÁRDA L. Horse Mint

Calyx 15-nerved, usually hairy in the throat. Corolla elongated, with a slightly expanded throat; lips linear or oblong, somewhat equal, the upper erect, entire or slightly notched, the lower spreading, 3-lobed at the apex, its lateral lobes ovate and obtuse, the middle one narrower and slightly notched. Stamens elongated, ascending, inserted in the throat of the corolla. — Odorous erect herbs, with entire or toothed leaves, and large attractive flowers in a few verticels closely surrounded by bracts. (Dedicated to *Nicolás Monardes*, author of many tracts upon medicinal and other useful plants, especially those of the New World, in the latter half of the 16th century.)

* *Stamens and style exserted beyond the linear straight acute upper lip of the corolla; heads solitary and terminal or sometimes* 2 *or* 3; *leaves acutely more or less serrate; perennials.*

— *Leaves petioled; calyx-teeth scarcely longer than the width of the tube.*

— *Glabrous or villous.*

= *Calyx smooth or smoothish in the throat.*

1. **M didyma** L. (Oswego Tea, Bee Balm.) Stem somewhat hairy, 1 m. or less high, acutely 4-angled; leaves ovate-lanceolate, acuminate, *the floral*

ones and the large outer bracts tinged with red; calyx smoothish, nearly naked in the throat; corolla smooth or minutely pubescent, 4–5 cm. long, bright red, showy. — Moist woods, by streams, w. Que., Ont., and southw. July, Aug.

= = *Calyx hairy in the throat.*

2. **M. clinopòdia** L. Nearly glabrous to villous-pubescent; leaves ovate-lanceolate and ovate; *bracts whitish; calyx moderately hirsute in the throat; corolla slightly pubescent, 2–2.5 cm. long, dull white or flesh-colored.* — Shady places, ravines, etc., N. Y. to Ill. and Ga. July.

3. **M. fistulòsa** L. (Wild Bergamot.) Branches more or less villous or hirsute, 0.5–1.5 m. high; *leaves* ovate-lanceolate, pubescent especially beneath, *the uppermost and outer bracts somewhat colored* (whitish or purplish); *calyx* slightly curved, *very hairy in the throat; corolla 2.5–4 cm. long, lilac or pink,* the upper lip very hairy. — Dry soil, N. E. to Col. and Tex.; often cultivated and mostly introd. northeastw. Var. rùbra Gray. Stem smooth; corolla bright crimson or rose-red; habit of no. 1, but upper lip of corolla villous-bearded on the back at tip; throat of calyx with the outer bristly hairs widely spreading. (*M. media* Willd.) — Me. to Ont. and Tenn.; mostly introd. northw. July, Aug.

+ + *Leaves canescent (especially beneath) with minute appressed puberulence.*

4. **M. móllis** L. Tall and branching; leaves firm, oblong- or deltoid-ovate, long-acuminate; throat of calyx mostly filled with dense beard, with sometimes an outer row of bristles; corolla flesh-color to lilac, glandular, its upper lip hairy outside or more bearded at the tip. (*M. scabra* Beck; *M. fistulosa*, var. *mollis* Benth.) — Dry plains, Me. to Man., and southw. July, Aug.

+ + *Leaves nearly sessile; calyx-teeth elongated, lax; head solitary.*

5. **M. Bradburiàna** Beck. Leaves clothed with long soft hairs, especially underneath; the floral and the outer bracts somewhat heart-shaped, purplish; calyx smoothish, contracted above, very hairy in the throat, with awl-shaped awned teeth; corolla smoothish, bearded at the tip of the upper lip, scarcely twice the length of the calyx, pale-purplish or white, the lower lip dotted with purple. — Thickets and woods, Ind. to Tenn. and Mo. May–July.

* * *Stamens not exceeding the falcate upper lip of the short corolla; heads axillary or interrupted-spicate; leaves lanceolate or oblong, sparsely serrate, tapering into the petiole.*

6. **M. punctàta** L. (Horse Mint.) *Perennial*, minutely downy, 3–9 dm. high; leaves petioled, lanceolate, narrowed at base; *bracts lanceolate, blunt,* obtuse at base, sessile, yellowish and purple; *teeth of* the downy *calyx short and awnless,* rigid, soon spreading; *corolla* nearly smooth, *yellowish,* the upper lip *spotted with purple,* notched at the apex, the tube scarcely exceeding the calyx. — Sandy ground, N. Y. to Minn., s. to Fla. and Tex.; adv. in N. E. July–Sept.

7. **M. citriodòra** Cerv. (Lemon Mint.) *Annual*, 3–8 dm. high; *bracts* narrowly oblong, *their slender awned tips spreading or recurving; calyx-teeth slender,* at length usually spreading; *corolla white or pinkish, not spotted.* — Ill. to Neb. and Tex. June–Sept.

22. BLEPHÍLIA Raf.

Calyx 13-nerved, naked in the throat; upper lip with 3 awned teeth, the lower with 2 nearly awnless teeth. Corolla inflated in the throat, nearly equally 2-lipped; upper lip erect, entire, the lower spreading, 3-cleft, its lateral lobes ovate and rounded, larger than the oblong and notched middle one. Stamens exserted (the upper pair minute or none). — Perennial herbs, with nearly the foliage, etc., of *Monarda;* the small pale bluish-purple flowers crowded in axillary and terminal globose whorls; in summer. (Name from βλεφαρίς, *the eyelash,* in reference to the hairy fringe of the bracts and calyx-teeth.)

1. **B. ciliàta** (L.) Raf. Somewhat downy, 3–9 dm. high; *leaves almost sessile, oblong-ovate, narrowed at base,* whitish-downy underneath; outer-*bracts*

ovate, acute, colored, ciliate, as long as the calyx; corolla hairy. — Dry open places, Vt. to Minn., s. to Ga. and Mo.

2. **B. hirsûta** (Pursh) Benth. (Wood Mint.) Taller, hairy throughout; *leaves long-petioled, ovate, pointed, rounded or heart-shaped at base;* the lower floral ones similar, the uppermost and the *bracts linear-awl-shaped*, shorter than the long-haired calyx; corolla pale, with darker purple spots. — Moist shady places, w. Que. and Vt. to Minn., s. to Ga. and e. Tex. Var. GLABRÀTA Fernald. Stem and leaves glabrous. — Local, s. Vt. (*Miss Day*).

23. HEDEÔMA Pers. Mock Pennyroyal

Calyx ovoid or tubular, gibbous on the lower side near the base, 13-nerved, bearded in the throat, 2-lipped; upper lip 3-toothed, the lower 2-cleft. Upper lip of corolla flat, notched at the apex, the lower spreading, 3-cleft. — Low odorous annuals, with small leaves and loose axillary clusters of flowers (in summer) often forming terminal leafy racemes. (Altered from ἡδύοσμον, an ancient name of Mint, from ἡδύς, *sweet*, and ὀσμή, *scent*.)

* *Sterile filaments manifest; leaves oblong-ovate, petioled, somewhat serrate.*

1. **H. pulegioìdes** (L.) Pers. (American Pennyroyal.) Erect, branching, hairy; whorls few-flowered; upper calyx-teeth triangular, the lower setaceous-subulate; corolla bluish, pubescent, scarcely exserted, 3–5 mm. long; taste and odor nearly of the true *Pennyroyal* (*Mentha Pulegium*) of Europe. — Dry soil, N. S. and Que. to Dak., and southw.

** *Sterile filaments minute or obsolete; leaves narrow, entire, sessile or nearly so.*

2. **H. híspida** Pursh. Mostly low; *leaves linear, crowded, almost glabrous*, somewhat hispid-ciliate; *bracts spreading or reflexed;* upper flowers rather crowded; *calyx-teeth all subulate*, equaling the bluish corolla. — Plains and rocky banks, N. Y. (*Haberer*) and Ont. to Sask. and La.; locally introd. in Vt.

24. MELÍSSA [Tourn.] L. Balm

Calyx with the upper lip flattened and 3-toothed, the lower 2-cleft. Corolla with a recurved-ascending tube. Stamens 4, curved and conniving under the upper lip. Otherwise nearly as *Satureja*. — Clusters few-flowered, loose, one-sided, with few and mostly ovate bracts resembling the leaves. (Name from μέλισσα, *a bee;* the flowers yielding abundance of honey.)

1. **M.** officinàlis L. (Common B.) Upright, branching, perennial, pubescent; leaves broadly ovate, crenate-toothed, lemon-scented; corolla nearly white. — Sparingly escaped from gardens. (Introd. from Eu.)

25. SATURÈJA [Tourn.] L. Savory. Calamint

Calyx tubular to bell-shaped, 10–13-nerved, naked or hairy in the throat. Corolla with a straight tube and an inflated throat, distinctly 2-lipped; the upper lip erect, flattish, entire or notched; the lower spreading, 3-parted, the middle lobe usually largest. Stamens 4, somewhat ascending. — Herbs or shrubs, with mostly purplish or whitish flowers produced all summer; inflorescence various. (The ancient Latin name.) Including Clinopodium L. Calamintha Lam.

§ 1. *Loosely flowered, without long-subulate bracts.*

* *Calyx bell-shaped, naked in the throat.*

1. **S.** hortènsis L. (Summer S.) Pubescent annual; leaves linear, entire; clusters few-flowered, in dense interrupted spikes; bracts small or none. — Escaped from gardens and sparingly wild, N. B. to Mich. and Ky. (Introd. from Eu.)

** * Calyx cylindric or tubular, hairy in the throat.*

+ Pubescent; bracts minute.

++ Common peduncle short but distinct.

2. S. Népeta (L.) Scheele. (Basil Thyme.) Soft-hairy; stem ascending, 1 m. or less high; *leaves* petioled, *broadly ovate, obtuse, crenate;* corolla 7–8 mm. long, twice the length of the calyx. (*Calamintha* Savi; *Clinopodium* Ktze.) — Dry waste grounds, Md. to Ind., Ark., and southw. (Nat. from Eu.)

++ ++ Common peduncle none.

3. S. Ácinos (L.) Scheele. Mostly branching and decumbent at base, 1.5–2.5 dm. high; *leaves elliptic-ovate to -oblong, acute,* about 1 cm. long, petioled; *calyx constricted at the throat.* (*Clinopodium* Ktze.) — Roadsides and waste places, Mass. to Ont. and N. J. (Nat. from. Eu.)

+ + Glabrous or nearly so; common peduncles hardly any; pedicels 1–5, *slender, the conspicuous bracts subulate-acuminate.*

4. S. glabélla (Michx.) Briquet. Smooth; *stems diffuse or spreading,* 2–5 dm. long; *leaves* slightly petioled, *oblong or oblong-linear,* narrowed at base, 2–5 cm. long, *sparingly toothed* or nearly entire; clusters 3–5-flowered; corolla purplish, about 1 cm. long, fully twice the length of the calyx. (*Calamintha* Benth.; *Clinopodium* Ktze.) — Damp (generally calcareous) soil, s. Ind., Ky., Tenn., and Ark.

5. S. glàbra (Nutt.) Fernald. Smaller; the flowering stems more upright, 1.5–4 dm. high, *with narrower mostly entire leaves and fewer-flowered clusters, while sterile runners from the base bear ovate thickish leaves* 0.5–1 *cm. long.* (*Clinopodium* Ktze.; *Calamintha Nuttallii* Benth.) — Rocky banks, N. Y. and e. Ont. to Minn. and Tex.

§ 2. *Flowers in sessile dense many-flowered clusters, and involucrate with conspicuous setaceous-subulate bracts; calyx nearly naked in the throat.*

6. S. vulgàris (L.) Fritsch. (Basil.) Hairy, erect, 2–6 dm. high; leaves ovate, petioled, nearly entire; flowers lavender to pink, in globular clusters; hairy bracts as long as the calyx. (*Clinopodium* L.; *Calamintha Clinopodium* Benth.) — Woods, thickets, and alluvial banks, Nfd. to Va., O., Ind., and Man. (Eurasia.)

26. HYSSÒPUS [Tourn.] L. Hyssop

Calyx tubular, 15-nerved, equally 5-toothed, naked in the throat. Corolla short, 2-lipped; upper lip erect, flat, obscurely notched, the lower 3-cleft, with the middle lobe larger and 2-cleft. — Perennial herb, with wand-like simple branches, lanceolate or linear entire leaves, and blue-purple flowers in small clusters, crowded in a spike. (The ancient name.)

1. H. officinàlis L. — Roadsides, etc., sparingly escaped from gardens. (Introd. from Eu.)

27. ORÍGANUM [Tourn.] L. Wild Marjoram

Calyx hairy in the throat, striate, 5-toothed. Tube of the corolla about the length of the calyx; the upper lip rather erect and slightly notched, the lower longer, of 3 nearly equal spreading lobes. Stamens exserted, diverging. — Perennials, with nearly entire leaves, and purplish flowers crowded in cylindrical or ellipsoid spikes, imbricated with colored bracts. (An ancient Greek name, composed of *ὄρος, a mountain,* and *γάνος, ornament.*)

1. O. vulgàre L. Upright, hairy, corymbose at the summit; leaves petioled, round-ovate; bracts ovate, obtuse, purplish. — Roadsides and fields, Mass to Ont. and Pa. June–Oct. (Nat. from Eu.)

28. PYCNANTHEMUM Michx. Mountain Mint. Basil

Calyx about 13-nerved, naked in the throat. Corolla short, more or less 2-lipped; the upper lip straight, nearly flat, entire or slightly notched; the lower 3-cleft, its lobes all ovate and obtuse. Lower pair of stamens rather longer than the upper; anther-cells parallel. — Perennial upright herbs, with a pugent mint-like flavor, corymbosely branched above, the floral leaves often whitened; the many-flowered whorls dense, crowded with bracts, and usually forming terminal heads or close cymes. Corolla whitish or purplish, the lips mostly dotted with purple. Fl. summer and early autumn. Varies, like the Mints, with the stamens exserted or included in different flowers. (Name composed of πυκνός, *dense*, and ἄνθεμον, *a blossom*, from the compact inflorescence.) Koellia Moench.

* *Calyx-teeth long, bristly-ciliate, or at least bearing long terminal bristles.*

← *Glomerules terminating the upper branches, rather densely clustered and forming a corymb.*

1. **P. léptodon** Gray. *Soft-pubescent*, or glabrate below, loosely branched; *leaves membranaceous, green*, 3–6 cm. long, *lanceolate or oblong-lanceolate*, entire or subentire, subsessile; inflorescence canescent-hirsute; *long-acuminate bracts and calyx-teeth slender-subulate, villous-hirsute.* — O. to Mo. and N. C.

← ← *Glomerules verticillastrate or terminating short paniculately disposed branches.*

2. **P. clinopodioìdes** T. & G. *Pubescent; leaves* short-petioled, *broad- or oblong-lanceolate, sharply denticulate or entire, all pale green, the upper not whitened;* bracts loose, slightly ciliate; *calyx-teeth one third or one half as long as the tube, sparingly bristle-tipped.* (*Koellia* Ktze.) — Dry soil, Ct. to Pa. and Va.

3. **P. pycnanthemoìdes** (Leavenw.) Fernald. Pubescent; *leaves* ovate-oblong, remotely toothed, the lower dark green and *loosely soft-downy, the floral ones whitened;* cymes dense; *bracts much surpassing the flowers*, their *long awn-like points* and the *awn-pointed calyx-teeth (equaling the tube) bearded with long loose hairs.* (*Koellia* Ktze.; *P. Tullia* Benth.) — Va. to Ky., and southw. — Sometimes too near no. 10.

* * *Calyx-teeth without long bristles (except in dubious forms of no.* 10).

← *Bracts and equal calyx-teeth awn-tipped, rigid, naked, as long as the corolla; flowers in dense heads mostly terminating the branchlets; leaves slightly petioled.*

4. **P. aristàtum** Michx. Minutely hoary-puberulent, 4–8 dm. high; leaves ovate-oblong and oblong-lanceolate, acute, sparingly denticulate-serrate, 2–6 cm. long, roundish at the base. (*Koellia* Ktze.) — Pine barrens, N. J. to Fla. and La.

Var. **hyssopifòlium** (Benth.) Gray. Leaves narrowly oblong or broadly linear, nearly entire and obtuse. (*Koellia hyssopifolia* Britton.) — Va. to Fla.

← ← *Bracts and equal and similar calyx-teeth not long-awned.*

→ *Leaves lanceolate or linear; heads mostly terminating the branches, subcorymbosely disposed.*

= *Leaves linear.*

5. **P. flexuòsum** (Walt.) BSP. Smooth, freely branching; leaves firm; heads 5 mm. or less high, somewhat downy, densely corymbose; appressed rigid bracts and lance-subulate calyx-teeth with short firm points. (*Koellia* MacM.; *P. linifolium* Pursh.) — Dry ground, centr. Me. to Minn., and southw.

= = *Leaves lanceolate.*

a. Leaves all glabrous or merely pubescent on the nerves beneath.

6. **P. virginiànum** (L.) Durand & Jackson. *Smoothish or minutely pubescent*, 2–10 dm. high; *leaves lanceolate or lance-linear, nearly sessile, entire,*

very numerous, obtuse at base; capitate glomerules small and numerous, densely corymbose, imbricated with many short appressed downy rigid ovate or lanceolate bracts; *calyx-teeth short and triangular.* (*Koellia* MacM.; *P. lanceolatum* Pursh.) — Dry banks, centr. Me. to Dak., and southw

7. **P. Torrèi** Benth. *Puberulent;* stem strict and nearly simple, 5–9 dm. high; *leaves thin,* lanceolate or *linear-lanceolate, tapering to both ends,* petioled, nearly entire; flowers in mostly terminal dense capitate clusters; *awl-shaped calyx-teeth* and mostly appressed bracts canescent. (*Koellia verticillata* Am auth., in part, not Ktze.) — Dry soil. N. Y. and Pa. to Ga.

b. At least the uppermost leaves closely puberulent above.

8. **P. pilòsum** Nutt. Hoary with loose pubescence; *leaves thick, pubescent and dull, oblong-lanceolate,* entire, *mostly acute or acutish at base,* the upper green; *bracts and* especially the *narrow* (often somewhat unequal) *calyx-teeth* villous-pubescent, *canescent; stamens exserted.* (*Koellia* Britton; *P. muticum,* var. Gray.) — Prairies and dry woods, Pa. to Ia., Kan., and Ark.

9. **P. verticillàtum** (Michx.) Pers. Stem closely pubescent, especially above; *leaves* lanceolate, entire or subentire, subsessile, *mostly glabrous,* only the upper closely puberulent and paler; *bracts* of the glomerules *ovate-lanceolate, ciliate,* with subulate tips; *stamens included.* (*Koellia* Ktze.) — Moist fields and open woods, w. Que., Vt., and e. Mass. to N. C.

↔ ↔ Leaves ovate or ovate-oblong

= Calyx and bracts densely invested with close minute appressed pubescence.

10. **P. incànum** (L.) Michx. *Leaves* ovate-oblong, acute, remotely toothed, *downy above and mostly hoary with whitish wool underneath, the uppermost whitened both sides; cymes large, open, mostly verticillastrate or terminal, few;* bracts linear or lanceolate, more or less bristly-ciliate; *calyx-teeth deltoid, short, herbaceous,* rarely a little bristly-ciliate. (*Koellia* Ktze.) — Open woods, Vt. and Mass. to Ont., Mo., and southw.

11. **P. albéscens** T. & G. Closely resembling the preceding, but *with no villous pubescence, the leaves closely cinereous-puberulent beneath.* (*Koellia* Ktze.) — Low sandy ground, Va. and Ky. to Fla. and Tex.

= = Calyx and bracts pilose or hispid with distinct spreading hairs.

12. **P. mùticum** (Michx.) Pers. *Minutely hoary* throughout, or becoming almost smooth, corymbosely much branched, 3–9 dm. high; *leaves ovate or broadly ovate-lanceolate, rather rigid, acute, rounded or slightly heart-shaped at base,* mostly sessile and minutely sharp-toothed, prominently veined, green and glabrate when old; *the floral ones and the subulate-tipped lance-attenuate or linear bracts* and the calyx-teeth *hoary; flower-clusters* very dense, *corymbose;* stamens exserted. (*Koellia* Britton.) — N. H. to Mo., and southw.

13. **P. montànum** Michx. *Glabrous* or essentially so, tall (6–10 dm. high), *simple or sparingly branched above; leaves lance-ovate or -oblong, thin,* sharply serrate, acuminate; *heads chiefly in the upper axils, or solitary at the tips of the elongate branches;* the long thin bracts long-acuminate, ciliate-hispid; calyx-teeth deltoid-subulate, smoothish. (*Koellia* Ktze.) — Mountain woods, Va. to Tenn., and southw.

29. THÝMUS [Tourn.] L. Thyme

Calyx 13-nerved, hairy in the throat; the upper lip 3-toothed, spreading; the lower 2-cleft, with the awl-shaped divisions ciliate. Corolla short; the upper lip straight and flattish, notched at the apex, the lower 3-cleft. Stamens 4, straight and distant, usually exserted. — Low perennials, with small and entire strongly veined leaves, and purplish or whitish flowers. (The ancient Greek name of the Thyme, probably from θύειν, *to burn perfume,* because it was used for incense.)

1. **T. Serpýllum** L. (Creeping T.) Prostrate; leaves green, flat, ovate, entire, short-petioled; flowers crowded at the ends of the branches. — Old fields, etc., N. S. to N. Y. and Pa. July, Aug. (Nat. from Eu.)

30. CUNÌLA L. Dittany

Calyx ovoid-tubular, equally 5-toothed, very hairy in the throat. Upper lip of corolla erect, flattish, mostly notched; the lower spreading, 3-cleft. Stamens 2, erect, exserted; sterile filaments short, minute. — Perennials, with small white or purplish flowers, in corymbed cymes or clusters. (An ancient Latin name, of unknown origin.)

1. **C. origanoìdes** (L.) Britton. (Common D.) Stems tufted, corymbosely much branched, 2–4 dm. high; leaves smooth, ovate, serrate, rounded or heart-shaped at base, nearly sessile, dotted, 1.5–4 cm. long; cymes peduncled; calyx striate. (*C. Mariana* L.) — Dry hills, N. Y. to Ill., Ark., and Ga.

31. LÝCOPUS [Tourn.] L. Water Horehound

Calyx bell-shaped, 4–5-toothed, naked in the throat. Corolla bell-shaped. Stamens 2, distant, the upper pair either sterile rudiments or wanting. Nutlets with thickened margins. — Perennial mostly stoloniferous herbs, glabrous or puberulent, resembling Mints, with sharply toothed or pinnatifid leaves, the floral ones similar and much longer than the dense axillary whorls of small mostly white flowers; in summer. (Name compounded of λύκος, *a wolf*, and πούς, *foot*, from some fancied likeness in the leaves.)

* *Leaves merely serrate.*

+ *Calyx-teeth lanceolate or deltoid, barely acutish, shorter than the mature nutlets.*

1. **L. virgínicus** L. (Bugle Weed.) *Stem* obtusely angled, *usually puberulent*, 2–8 dm. high, rising *from a slender (not tuberous-thickened) base;* stolons filiform, not tuberiferous; *leaves dark green* (or purple-tinged), *ovate or ovate-oblong*, firm, rather abruptly acuminate at both ends, coarsely toothed, 6–15 cm. long, 2–5 cm. broad; glomerules dense, often seemingly compound, in maturity 8–15 mm. broad; *calyx ovoid-cylindric; corolla tubular, with erect lobes;* stamens mostly included. — Rich moist soil, N. H. to Neb., and southw. (Asia.)

2. **L. uniflòrus** Michx. (Bugle Weed.) Similar, but *usually more* slender and *glabrate, from a tuberous base;* stolons finally tuberiferous; *leaves light green* (rarely purple-tinged), thinner, *lanceolate to lance-oblong*, gradually narrowed at both ends, 2–11 cm. long, 0.5–3.5 cm. broad; glomerules smaller and less dense, in maturity 4–9 mm. broad; *calyx campanulate; corolla with flaring lobes;* stamens mostly exserted. (*L. communis* and *L. membranaceus* Bicknell.) — Low ground, Nfd. and Lab. to B. C., s. to mts. of Va., Mich., Minn., Neb., Wyo., and Ore. (Asia.)

+ + *Calyx-teeth narrow, very acute, longer than the nutlets.*

++ *Bracts minute; corolla twice as long as the calyx.*

3. **L. sessilifòlius** Gray. Tuberiferous; stem rather acutely 4-angled, puberulent; *leaves closely sessile*, ovate to lanceolate, 3–10 cm. long, sparsely sharp-serrate; *calyx-teeth subulate, rigid.* — Low grounds, Mass. to Fla. and Miss., near the coast.

4. **L. rubéllus** Moench. Stem rather obtusely 4-angled; *leaves petioled*, ovate-oblong or oblong-lanceolate, sharply serrate in the middle, *attenuate-acuminate at both ends*, 4–12 cm. long; *calyx-teeth* triangular-subulate, *not rigid-pointed.* — Vt. and Mass. to Minn., and southw. — Resembles no. 1, but has long slender calyx-teeth.

++ ++ *Outer bracts conspicuous; corolla hardly exceeding the calyx.*

5. **L. lùcidus** Turcz., var. **americànus** Gray. Stem strict, stout, 2–9 dm. high; leaves lanceolate and oblong-lanceolate, 5–10 cm. long, acute or acuminate, very sharply and coarsely serrate, sessile or nearly so; calyx-teeth lance-ovate, acuminate. (*L. asper* Greene.) — Mich. to Man., Kan., and westw. — Typical *L. lucidus* of Asia and n. w. Am., with elongate subpetiolate leaves and lance-subulate calyx-teeth, approaches our n. w. borders.

** * Leaves incised or pinnatifid at least at base.*

6. L. EUROPAÈUS L. Rarely stoloniferous, not tuberiferous; *stem coarse, more or less villous*, 1 m. or less high; *leaves* petioled, *ovate, pubescent*, coarsely toothed, sinuate or pinnatifid at base; calyx-teeth subulate-tipped. — Damp or waste ground, Mass to Va. (Nat. from Eu.)

7. L. americànus Muhl. *Stem* erect, *slender*, 2–9 dm. high, acutely 4-angled, *glabrate, freely stoloniferous; leaves oblong or lanceolate, acuminate, irregularly incised or laciniate-pinnatifid, the upper narrow and merely sinuate*, all tapering to slender petioles; calyx-teeth short-cuspidate; sterile filaments slender, conspicuous, with globular or spatulate tips. (*L. sinuatus* Ell.) — Damp soil, Nfd. to B. C., and southw.

32. MÉNTHA [Tourn.] L. MINT

Calyx bell-shaped or tubular, the 5 teeth equal or nearly so. Corolla with a short included tube, the upper lobe slightly broader, entire or notched. Stamens 4, equal, erect, distant. — Odorous perennial herbs; the small flowers mostly in close clusters, forming axillary capitate whorls, sometimes approximated in interrupted spikes, produced in summer, of two sorts as to the fertility of the stamens in most species. Corolla pale purple or whitish. Species mostly adventive or naturalized from Europe, with many hybrids. (Μίνθη of Theophrastus, from a Nymph of that name, fabled to have been changed into Mint by Proserpine.)

** Spikes narrow and leafless, densely crowded; leaves sessile or nearly so.*

+ Spikes canescent.

1. M. LONGIFÒLIA (L.) Huds. (HORSE M. of Eu.) *Finely pubescent or canescent; leaves ovate-oblong to oblong-lanceolate, acute, sharply serrate*, often glabrous above; *spikes* rather slender, *canescently pubescent.* (*M. sylvestris* L.) — Roadsides, etc., Ct. to Del., Pa., and O. (Nat. from Eu.)

2. M. ALOPECUROÌDES Hull. Downy; *leaves* larger, more near'y sessile, broadly *oval and obtuse*, often subcordate, *coarsely open-dentate, more veiny, but not rugose* above; *spikes coarser*, canescent; approaching the next. — Damp roadsides, etc., Ct. to N. J., Mo., and Wisc. (Nat. from Eu.)

+ + Spikes not canescent.

3. M. ROTUNDIFÒLIA (L.) Huds. *Soft-hairy* or downy; *leaves* broadly elliptical to *round-ovate* and somewhat heart-shaped, *rugose, coarsely crenate-toothed*; spikes slender. — At a few stations, Me. to O., Fla., and Tex. (Nat. from Eu.)

4. M. SPICÀTA L. (SPEARMINT.) *Nearly smooth; leaves oblong- or ovate-lanceolate, unequally serrate*, sometimes short-petioled; bracts linear-lanceolate and subulate, conspicuous. (*M. viridis* L.) — Wet places, common (Nat. from Eu.)

** * Flowers pedicellate, less crowded in interrupted leafless spiciform clusters or terminal heads, or some in the upper axils; leaves petioled.*

+ Calyx (at least the teeth) more or less hirsute.

5. M. PIPERÌTA L. (PEPPERMINT.) *Glabrous*, very pungent-tasted; leaves ovate-oblong to oblong-lanceolate, acute, sharply serrate; *spikes becoming loose; calyx glabrous below, the teeth hirsute.* — Along brooks, frequent. (Nat. from Eu.)

6. M. AQUÁTICA L. (WATER M.) *Pubescent with recurved hairs;* leaves ovate or round-ovate; flowers in a terminal *globular or interrupted and ellipsoid head*, often with one or more clusters in the axils of the upper leaves; *calyx and pedicels hairy.* — Wet places, N. S. to Del., rare. (Nat. from Eu.)

7. M. CRÍSPA L. Glabrous or slightly pubescent; *leaves* short-petioled, ovate to orbicular, *lacerate-dentate and crisped; spikes narrow;* calyx slightly pubescent or glabrate below. — Wet ditches, etc., Ct. to Pa. (Nat. from Eu.)

+ + *Calyx glabrous.*

8. **M. citràta** Ehrh. *Glabrous or glabrate; leaves slender-petioled*, ovate, coarsely *appressed-serrate;* flowers in *small roundish heads*, terminal and in the upper axils. — Damp soil, Ct. and N. Y. to O. and Mich. (Nat. from Eu.)

* * * *Flowers in globular whorls or clusters, all in the axils of the leaves, the uppermost axils rarely flower-bearing; leaves more or less petioled, toothed.*

+ *Upper leaves conspicuously reduced, 2 or 3 times exceeding the glomerules.*

9. **M. Cardìaca** Gerarde. *Tall and erect, with ascending branches toward the top;* stem more or less pubescent; *leaves* lanceolate to oblong-lanceolate, acuminate, *sharply serrate*, slightly pubescent. (*M. sativa* of many Am. auth., not L.) — Wet meadows and shores, N. S. to Pa. (Nat. from Eu.) — Resembling *M. spicata*, but with more interrupted leafy inflorescence.

+ + *Upper leaves scarcely reduced, much exceeding the glomerules.*

++ *Stem glabrous or rarely with a few scattered hairs.*

10. **M. gentìlis** L. *Stems freely branching from below, often reddish*, 1 m. or less high; *leaves* ovate to obovate, *coarsely and sharply serrate*, especially above, slightly pubescent or glabrate, frequently white-mottled. (*M. sativa* L.) — Rich damp soil, P. E. I. to Ia. and N. C. (Nat. from Eu.)

++ ++ *Stems retrorse-pubescent at least on the angles with fine hairs.*

11. **M. arvénsis** L. *Stems* freely branching, especially below, or subsimple, 1–8 dm. high, more or less *retrorse-pubescent; leaves oblong to ovate, rounded at base, minutely pubescent or villous*, closely serrate, the primary ones distinctly petioled; calyx pubescent, the teeth from deltoid to subulate; corolla white, pink, or violet. — Abundant in damp rich soil, Nfd. to Neb. and Ky.; also in Cal., etc. (Eurasia.)

Var. **canadénsis** (L.) Briquet. *Leaves pubescent, lanceolate to oblong-lanceolate, cuneate-narrowed at base.* (*M. canadensis* L.) — N. B. to B. C., and southw. Var. lanàta Piper. Stems and lower surfaces of leaves *densely tomentose or lanate.* — Me. to B. C. and Cal.

Var. **glabràta** (Benth.) Fernald. Less branched; *stems glabrous on the sides*, minutely pubescent on the angles; *leaves oblong to ovate, glabrous*, short-petioled. (*M. canadensis*, var. Benth.; *M. arvensis*, var. *Penardi* Briquet.) — Gaspé Co., Que., to B. C., s. to n. N. E., n. Pa., Mo., N. Mex., and Cal.

33. COLLINSÒNIA L. Horse Balm

Calyx ovoid, enlarged and declined in fruit, 2-lipped; upper lip truncate and flattened, 3-toothed, the lower 2-cleft. Corolla elongated, expanded at the throat, somewhat 2-lipped, the tube with a bearded ring within; the 4 upper lobes nearly equal, but the lower much larger and longer, pendent, toothed or lacerate-fringed. Stamens 2 (sometimes 4, the upper pair shorter), much exserted, diverging; anther-cells divergent. — Strong-scented perennials, with large ovate leaves, and yellowish flowers on slender pedicels. (Named in honor of *Peter Collinson*, early English botanist.)

1. **C. canadénsis** L. (Rich-weed. Stone-root.) Nearly smooth, 5–10 dm. high; leaves serrate, pointed, petioled, 1–2 dm. long; panicle loose; corolla 1.5 cm. long, lemon-scented; stamens 2. — Rich moist woods, w. Que. to Wisc., s. to Fla. and Mo. July–Sept.

34. PERÍLLA L.

Calyx as in *Collinsonia*. Corolla-tube included, the limb 5-cleft; lower lobe a little larger. Stamens 4, included, erect, distinct. — Coarse aromatic annual, with small flowers. (A Greek and Latin proper name.)

1. **P. frutéscens** (L.) Britton. Erect, branching, 0.3–1 m. high; leaves ovate, coarsely toothed; flowers white. (*P. ocymoides* L.) — About dwellings and roadsides, Ct. to Mo. and N. C. (Nat. from e. Asia.)

35. ELSHÓLTZIA Willd.

Calyx with equal teeth. Corolla 4-lobed, slightly 2-lipped. Stamens 4, ascending, exserted, didynamous; anther-cells divergent. — Herbs, with ovate or oblong petioled leaves and spicate small flowers. (Named for *J. S. Elsholtz*, German physician and botanist of the 17th century.)

1. **E.** PATRÌNI (Lepechin) Garcke. Smooth annual, 3–7 dm. high; bracts of the spike ovate, veiny, mucronate; calyx hirsute; corolla purplish, 2–3 mm. long. — Clearings and shores, L. Temiscouata, Que. (*Northrop*). (Nat. from Asia.)

SOLANÀCEAE (NIGHTSHADE FAMILY)

Herbs (or rarely shrubs), with colorless juice and alternate leaves, regular 5-merous and 5-androus flowers, on bractless pedicels; the corolla imbricate or valvate in the bud, and mostly plaited; the fruit a 2-celled (rarely 3–5-celled) many-seeded capsule or berry. Seeds campylotropous or amphitropous. Embryo mostly slender and curved in fleshy albumen. Calyx usually persistent. Stamens mostly equal, inserted on the corolla. Style and stigma single. Placentae in the axis, often projecting far into the cells. (Foliage rank-scented, and with the fruits mostly narcotic, often very poisonous, though some are edible.) — A large family in the tropics, but sparingly indigenous in our district, shading off into *Scrophulariaceae*, from which the plaited regular corolla and 5 equal stamens generally distinguish it.

(Various cultivated species, as the Tomato, LYCOPÉRSICON ESCULÉNTUM Mill., the Potato, SOLÀNUM TUBERÒSUM L., the Egg-plant, S. MELONGÈNA L., and Petunias, PETÙNIA AXILLÀRIS (Lam.) BSP. and P. VIOLÀCEA Lindl., stray from cultivation but seldom persist.)

* Corolla wheel-shaped, 5-parted or 5-lobed; the lobes valvate and their margins usually turned inward in the bud; anthers connivent; fruit a berry.

1. **Solanum.** Anthers opening by pores or chinks at the tip.

* * Corolla various, not wheel-shaped, nor valvate in the bud; anthers separate.

+ Fruit a berry, closely invested by an herbaceous (not angled) calyx.

2. **Chamaesaracha.** Corolla plicate, 5-angulate. Pedicels solitary, recurved in fruit.

+ + Fruit a berry, inclosed in the bladdery-inflated calyx; corolla widely expanding.

3. **Physalis.** Calyx 5-cleft. Corolla 5-lobed or nearly entire. Berry juicy, 2-celled.
4. **Nicandra.** Calyx 5-parted. Corolla nearly entire. Berry dry, 3–5-celled.

+ + + Fruit a berry, with the unaltered calyx persistent at its base.

5. **Lycium.** Corolla funnel-form or tubular, not plaited. Berry small, 2-celled.

+ + + + Fruit a capsule.

6. **Hyoscyamus.** Calyx urn-shaped, inclosing the smooth 2-celled capsule, the top of which falls off as a lid. Corolla and stamens somewhat irregular.
7. **Datura.** Calyx prismatic, 5-toothed. Capsule prickly, naked, more or less 4-celled, 4-valved. Corolla funnel-form.
8. **Nicotiana.** Calyx tubular-bell-shaped, 5-cleft. Capsule inclosed in the calyx, 2-celled.

1. SOLÀNUM [Tourn.] L. NIGHTSHADE

Calyx and wheel-shaped corolla 5-parted or 5-cleft (rarely 4–10-parted), the latter plaited in the bud, and valvate or induplicate. Stamens exserted; filaments very short; anthers converging around the style, opening at the tip by two pores or chinks. Berry usually 2-celled. Herbs, or shrubs in warm climates, the larger leaves often accompanied by a smaller lateral (rameal) one;

the peduncles also mostly lateral and extra-axillary. — A vast genus, chiefly in warmer regions. (Name of unknown derivation.)

** Not prickly; anthers blunt; flowers and globose naked berries small.*

← Perennial, climbing or twining.

1. **S. Dulcamàra** L. (Bittersweet.) More or less pubescent; leaves ovate-heart-shaped, the upper halberd-shaped, or with 2 ear-like lobes or leaflets at base; flowers (purple or blue) in small cymes; berries ovoid, red. — Moist banks and around dwellings. June–Sept. (Nat. from Eu.)

← ← Simple-leaved annuals.

2. **S. triflòrum** Nutt. Low, spreading, slightly hairy or nearly glabrous; *leaves oblong, pinnatifid* (7–9-lobed), with rounded sinuses; peduncles 1–3-flowered; corolla white; *berries green*, as large as a small cherry. — Ont. to Man., Kan., and westw.; chiefly a weed near dwellings.

3. **S. nìgrum** L. (Common N.) Low, much branched and often spreading, nearly glabrous; the stem rough on the angles; *leaves ovate, wavy-toothed; flowers* white, *in small umbel-like lateral clusters*, drooping; *calyx spreading;* filaments hairy; *berries* globular, *black.* — Shaded and rich open grounds; appearing as if introduced, but a cosmopolite. July–Sept.

Var. villòsum L. Low, somewhat viscid-pubescent or villous; leaves small, conspicuously angular-dentate; filaments glabrous; berries yellow. — Established near Philadelphia, from ballast. (Adv. from Eu.)

*** More or less prickly; anthers tapering upward; pubescence stellate.*

← Perennial; fruit naked; anthers equal; corolla violet, rarely white.

4. **S. carolinénse** L. (Horse Nettle.) *Hirsute or roughish-pubescent with 4–8-rayed hairs; prickles stout, yellowish*, copious (rarely scanty); *leaves oblong* or ovate, obtusely sinuate-toothed or lobed or sinuate-pinnatifid; racemes simple, soon lateral; *calyx-lobes acuminate;* berry 1–1.5 cm. broad. — Sandy soil and waste grounds, N. E. to Ont., westw. and southw.; adventive eastw.

5. **S. elaeagnifòlium** Cav. (White Horse Nettle.) *Silvery-canescent, with* dense scurf-like pubescence of *many-rayed hairs; prickles small, slender;* more or less copious or wanting; *leaves lanceolate* to oblong and linear, sinuate-repand or entire; *calyx-lobes slender;* berry 1–1.5 cm. in diameter. — Prairies and plains, Mo. to Tex., and westw.

← ← Annual; fruit partly covered by the spiny calyx; anthers equal; corolla blue or white.

6. **S. sisymbriifòlium** Lam. Villous with viscid hairs; strongly armed throughout with stout golden prickles; leaves deeply pinnatifid, the oblong lobes sinuate or deeply cut; calyx-lobes becoming ovate-lanceolate and loosely covering the berry. — Ballast and waste places near the coast. (Adv. from Trop. Am.)

← ← ← Annual; fruit closely covered; lowest anther much the longest.

7. **S. rostràtum** Dunal. (Buffalo Bur.) Very prickly, somewhat hoary or yellowish with a copious wholly stellate pubescence; leaves 1–2-pinnatifid; calyx densely prickly; *corolla yellow;* stamens and style much declined. — Plains of Neb. to Tex.; recently spread eastw. to the coast as a weed.

8. **S. citrullifòlium** A. Br. Similar, but less glandular-pubescent; *corolla violet*, 4 cm. broad. (*S. heterodoxum* Britton, not Dunal.) — Ia. and Kan., southwestw.

2. CHAMAESARÀCHA Gray.

Calyx herbaceous, closely investing the globose berry (or most of it), obscurely if at all veiny. Corolla rotate, 5-angulate, plicate in the bud. Filaments filiform; anthers separate, oblong. — Perennials, with mostly narrow entire or pinnatifid leaves tapering into margined petioles, and filiform naked pedicels solitary in the axils, refracted or recurved in fruit. (*Saracha* is a tropical

American genus dedicated to *Isidoro Saracha*, a Spanish Benedictine; the prefix χαμαί, *on the ground*, i.e. *dwarf*.)

1. **C. sórdida** (Dunal) Gray. Much branched from root or base, somewhat cinereous with short viscid pubescence; leaves obovate-spatulate or cuneate-oblong to oblanceolate, repand to incisely pinnatifid; calyx when young villous-viscid; corolla pale yellow or violet-purple, 1–1.5 cm. broad; berry as large as a pea. (*C. conioides* Britton.) — Dry or clayey soil, Kan. to Tex. and Ariz.

3. PHÝSALIS L. Ground Cherry

Calyx 5-cleft, reticulated and enlarging after flowering, at length much inflated and inclosing the 2-celled globular (edible) berry. Corolla between wheel-shaped and funnel-form, the very short tube marked with 5 concave spots at the base; the plaited border somewhat 5-lobed or barely 5–10-toothed. Stamens 5, erect; anthers separate, opening lengthwise. — Ours herbs with extra-axillary peduncles; flowering through the summer. (Name φυσαλίς, *a bladder*, from the inflated calyx.)

a. Corolla large, white with pale yellow center; calyx neither angled nor ribbed . . . . . 1. *P. grandiflora.*
a. Corolla lurid, greenish or yellowish-white to deep yellow with dark center *b.*
  b. Annual *c.*
    c. Glabrous or merely puberulent.
      Corolla 1–2.5 cm. broad . . . . . 2. *P. ixocarpa.*
      Corolla 4–10 mm. in diameter.
        Teeth of leaves acuminate . . . . . 3. *P. angulata.*
        Teeth of leaves obtusish . . . . . (6) *P. barbadensis*, v. *obscura.*
    c. Villous or pubescent, hairs simple, viscid or glandular.
      Fruiting calyx carinately 5-angled, its teeth during anthesis lanceolate.
        Fruiting calyx subglobose-ovoid, rather abruptly pyramidal at summit.
          Plant green . . . . . 4. *P. pubescens.*
          Plant somewhat hoary . . . . . 5. *P. pruinosa.*
        Fruiting calyx flask-shaped, gradually conic-pyramidal at summit 6. *P. barbadensis.*
      Fruiting calyx not sharply angled, its teeth deltoid during anthesis 7. *P. missouriensis.*
  b. Perennial *d.*
    d. Canescent, covered with short dense stellate tomentum . . . . 8. *P. viscosa.*
    d. Pubescence loose; hairs once or twice branched . . . . . 9. *P. pumila.*
    d. Hairs simple or none.
      Fruiting calyx scarlet . . . . . 10. *P. Alkekengi.*
      Fruiting calyx greenish.
        Leaves broadly ovate, rounded or cordate at base; viscid-pubescent . . . . . 11. *P. heterophylla.*
        Leaves narrowly ovate to oblong or lanceolate, cuneate at base.
          Nearly glabrous; leaves 4–5 times as long as broad . . 12. *P. longifolia.*
          Strigillose to villous-pubescent; leaves 1½–3 times as long as broad.
            Stem and branches strigillose . . . . . 13. *P. subglabrata.*
            Stem and branches spreading-villous, retrorsely puberulent or glandular-pulverulent . . . . . 14. *P. virginiana.*
            Stem and branches hirsutulous . . . . . 15. *P. lanceolata.*

1. **P. grandiflòra** Hook. Clammy-pubescent, erect; *leaves* lance-ovate, pointed, *entire or nearly so; corolla* 2.5–5 *cm. wide, white, with a pale yellow center*, woolly in the throat; fruiting calyx globular. (*Leucophysalis* Rydb.) — Recent clearings and sandy shores., e. Que. to the Saskatchewan, s. to L. Champlain, Mich., Wisc., and Minn.

2. **P. ixocárpa** Brotero. (Tomatillo.) Erect branching annual, 2–9 dm. high, glabrous or merely puberulent; *leaves entire to sharply sinuate-dentate;* peduncles 3–6 mm. long, distinctly shorter than the flowers; calyx-teeth deltoid; *corolla* 1–2.5 *cm. wide, lurid, yellowish or greenish, with dark center.* (*P. aequata* Jacq. f.) — Often cultivated and frequently spontaneous. (Introd. from the Southwest.) — The large purple fruit often bursts the calyx. *P. pendula* Rydb. appears to be a smaller-flowered long-peduncled extreme found from Ill. (*Vasey*) southw. and westw.

3. **P. angulàta** L. Much branched; *leaves* ovate or ovate-oblong, sharply and irregularly *laciniate-toothed;* peduncles filiform; *corolla unspotted, very*

small (6–10 mm. broad when expanded); fruiting calyx conical-ovoid with a truncate or sunken base, 10-angled, loosely inflated, at length well filled by the greenish-yellow berry. — Open rich grounds, Pa. to Minn., and southw.

4. **P. pubéscens** L. *Pubescent but not hoary;* leaves thin, entire at least near the oblique but rarely cordate base; stem slender, geniculate, diffusely branched; *fruiting calyx subglobose,* shortly acuminate, *carinately 5-angled.* — Pa. to Va., and westw.

5. **P. pruinòsa** L. (STRAWBERRY TOMATO.) *Hoary-pubescent;* stem stouter; leaves thicker, sinuate-dentate even to the oblique and distinctly cordate base; *fruiting calyx subglobose,* rather abruptly acuminate, carinately 5-angled. — Sandy soil, Mass. to Ont., Ia., Kan., and southw.

6. **P. barbadénsis** Jacq. Pubescent or somewhat hoary, near the two preceding but with more *elongated ovoid* and gradually attenuate *fruiting calyx* of somewhat firmer texture; leaves toothed or entire, rounded or subcordate at the scarcely oblique base. — Pa. (*Knipe*) to Mo. (*Bush*), and southw. Var. OBSCÙRA (Michx.) Rydb. Nearly glabrous. (*P. obscura* Michx.) — Mo. (*Bush, Eggert*), and southw.

7. **P. missouriénsis** Mackenzie & Bush. Leaves repand, oblique but not cordate at base, thin; flowers 4–8 mm. in diameter; *fruiting calyx subglobose, not sharply angled,* 2 cm. or less in length. — Mo. and Kan.

8. **P. viscòsa** L. *Cinereous or when young almost canescent with short stellate or 2–3-forked pubescence;* stems ascending or spreading from *slender creeping subterranean shoots; leaves ovate or oval,* varying to oblong and obovate, entire or undulate; corolla greenish-yellow, with a more or less dark eye; *fruiting calyx globose-ovoid; berry yellow or orange.* — In sands on and near the coast, Va. to N. C. and Fla.

9. **P. pùmila** Nutt. Dichotomously branched, 3 dm. high; stems geniculate, *shortly hirsute* with spreading once or twice branched sordid hairs; *leaves* ovate-oblong, *mostly entire,* acute or acutish at each end; *fruiting calyx yellowish-green, ovoid-pyramidal,* 2.5–3 cm. in diameter, scarcely umbonate at base. (*P. lanceolata,* var. *hirta* Gray.) — Dry ground, w. Mo. (*Bush*), and southwestw.

10. **P.** ALKEKÉNGI L. (WINTER CHERRY.) Stems subsimple, erect from a creeping perennial rootstock; leaves thin, green, broadly ovate, entire or angled; flowers 2.5 cm. in diameter; *fruiting calyces firm, veiny, scarlet or crimson.* — Frequently cultivated for its decorative fruit; said to be escaping locally, as also the doubtfully distinct P. FRANCHÈTI Masters (CHINESE LANTERN PLANT), which is annual and has even larger and more showy scarlet or crimson fruiting calyces (5 cm. in diameter). (Introd. from e. Asia.)

11. **P. heterophýlla** Nees. *Perennial,* diffusely much branched and widely spreading or at first erect, puberulent or tomentose, usually viscid; *leaves* sometimes oblong, *repand or obtusely toothed, acute or obtuse; corolla* 1.5–2.2 *cm. broad,* 5-angled or 5–10-toothed; anthers chiefly yellow. (*P. virginiana* Man. ed. 6, not Mill.) — Chiefly in sandy or alluvial soil, N. B., southw. and westw. Var. AMBÍGUA (Gray) Rydb. Spreading-villous; anthers chiefly purplish. — N. H., southw. and westw. Var. NYCTAGÍNEA (Dunal) Rydb. *Leaves thinner, mostly subentire and acuminate,* pubescent chiefly on the veins. — R. I., southw. and westw.

12. **P. longifòlia** Nutt. Essentially *smooth and green,* 4–6 dm. high, much branched above; *leaves narrowly lanceolate,* attentuate at each end, entire or undulate-dentate; calyx and peduncles more or less strigillose; corolla 1–1.5 cm. wide. — Bottom lands, etc., Ia. to S. Dak., and southwestw.

13. **P. subglabràta** Mackenzie & Bush. *Leaves ovate or ovate-oblong,* oblique at base, entire, repand, or sparingly angulate-toothed; peduncles 1-3 cm. long; calyx-teeth ovate-lanceolate; *corolla brownish-* or *violet-spotted in the center;* calyx at maturity globose and completely filled by the large reddish or purple berry and open at the mouth. (*P. philadelphica* Man. ed. 6, but perhaps not of Lam.) — Fertile soil, R. I. to Minn., and southw.

14. **P. virginiàna** Mill. Erect perennial; stem 1.5–3 dm. high, *villous; leaves* rather *narrowly ovate,* mostly acutish at each end, subentire or more often with 1–5 acutish or rounded teeth on each side, thinner than in the next species;

calyx-lobes lanceolate, in anthesis about equaling the tube; fruiting calyx 2.5 cm. long, deeply umbonate at base; *corolla pale yellow*, 1.8–2.3 cm. in diameter. (*P. lanceolata* Man. ed. 6, in part, not Michx.) — Dry hills, gravelly soil, etc., Ct. to Ia., and southw. The typical form with villous spreading pubescence seems relatively infrequent. The more common form has the pubescence on stem and branches very short, the hairs retrorse or recurved, not viscid. Occasional specimens are merely glandular-pulverulent. Var. INTERMÈDIA Rydb. Leaves larger, thinner, more entire; pubescence somewhat glandular when young. — Ind. (according to Britton), and southw.

15. **P. lanceolàta** Michx. More or less *hirsute-pubescent* with short stiff hairs, varying *to nearly glabrous;* stems from rather stout subterranean shoots, angled, somewhat rigid; *leaves oblong-ovate to lanceolate*, sparingly angulate-toothed or more often entire; *corolla ochroleucous, with a* more or less *dark eye;* calyx commonly hirsute, in fruit pyramidal-ovoid, 2.5–3.6 cm. long; berry reddish. — Dry prairies and on sandy or clayey bluffs, Ill. to Wyo. and N. Mex.; also southeastw. to S. C.

4. NICÁNDRA Adans. APPLE OF PERU

Calyx 5-parted, 5-angled, the divisions rather arrow-shaped, enlarged and bladder-like in fruit, inclosing the 3–5-celled globular dry berry. Corolla with border nearly entire. Otherwise much like *Physalis*. — Coarse smooth annual, with ovate sinuate-toothed or angled leaves, and solitary pale blue flowers on axillary and terminal peduncles. (Named for the poet *Nicander* of Colophon.) PHYSALODES Boehmer.

1. **N.** PHYSALÒDES (L.) Pers. (*Physalodes* Britton.) — Waste grounds, near dwellings and old gardens. July–Sept. (Introd. from Peru.)

5. LÝCIUM L. MATRIMONY VINE

Calyx 3–5-toothed or -cleft, not enlarging, persistent at the base of the berry Corolla funnel-form or salver-shaped, 5-lobed, the lobes imbricated and not plaited in the bud. Stamens 5; anthers opening lengthwise. Style slender; stigma capitate. Berry small, 2-celled. — Shrubby often spiny plants, with alternate and entire small leaves, and mostly axillary small flowers. (Named from the country, *Lycia*.)

1. **L.** HALIMIFÒLIUM Mill. (COMMON M.) Shrub with long sarmentose recurved-drooping branches, smooth, sparingly if at all spiny; leaves oblong- or spatulate-lanceolate, often fascicled, narrowed into a short petiole; flowers on slender peduncles fascicled in the axils; corolla short funnel-form, greenish-purple; style and slender filaments equaling the corolla-lobes; berry ovoid, orange-red. (*L. vulgare* Dunal.) — About dwellings, and sometimes escaped into waste grounds. (Introd. from Eu.)

6. HYOSCÝAMUS [Tourn.] L HENBANE

Calyx bell-shaped or urn-shaped, 5-lobed. Corolla funnel-form, oblique, with a 5-lobed more or less unequal plaited border. Stamens declined. Capsule inclosed in the persistent calyx, 2-celled, opening transversely all round near the apex, which falls off like a lid. — Clammy-pubescent fetid narcotic herbs, with lurid flowers in the axils of angled or toothed leaves. (Name composed of ὗς, *a hog*, and κύαμος, *a bean;* said to be poisonous to swine.)

1. **H.** NÌGER L. (BLACK H.) Biennial or annual; leaves clasping, sinuate-toothed and angled; flowers sessile, in one-sided leafy spikes; corolla dull yellowish, strongly reticulated with purple veins. — Open sandy soil and waste places, e. Que. to Ont. and Mich.; also rarely about ports southw. June, July (Nat. from Eu.)

7. DATÙRA L. Jamestown or Jimson Weed. Thorn Apple

Calyx prismatic or cylindrical, 5-toothed, separating transversely above the base in fruit, the upper part falling away. Corolla funnel-form, with a large and spreading 5–10-toothed plaited border. Stigma 2-lipped. Capsule globular, prickly, 4-valved, 4-celled except near the 2-celled top. Seeds rather large, flat. — Rank weeds, narcotic-poisonous, with ovate leaves, and large showy flowers produced all summer and autumn on short peduncles in the forks of the branching stem. (Altered from the Arabic name, *Tatorah.*)

1. **D.** Stramònium L. (Stramonium.) Annual, *glabrous;* leaves ovate, sinuate-toothed or angled; *stem green; calyx prismatic; corolla white*, 7–9 cm. long, the border with 5 teeth; lower prickles of the capsule mostly shorter. — Waste grounds; a well-known ill-scented weed. (Nat. from Asia?)

2. **D.** Tátula L. (Purple T.) Mostly taller; *stem purple; corolla pale violet-purple;* prickles of the capsule nearly equal. — Waste grounds, Atlantic States to Ont., Minn., and southwestw. (Nat. from Trop. Am.)

3. **D.** Mètel L. *Pubescent; leaves entire* or slightly toothed; *calyx tubular;* corolla 1.5–2 cm. long; capsule evenly prickly. — Waste ground, etc., becoming frequent. (Adv. from Trop. Am.)

8. NICOTIÀNA [Tourn.] L. Tobacco

Calyx tubular-bell-shaped, 5-cleft. Corolla funnel-form or salver-form, usually with a long tube; the plaited border 5-lobed. Stigma capitate. Capsule 2-celled, 2–4-valved from the apex. Seeds minute. — Rank acrid-narcotic herbs, mostly clammy-pubescent, with ample entire leaves, and racemed or panicled flowers. (Named after *Jean Nicot*, who was thought to have introduced Tobacco, *N. Tabacum* L., into Europe.)

1. **N.** rústica L. (Wild Tobacco.) Annual; leaves ovate, petioled; tube of the dull greenish-yellow corolla cylindrical, two thirds longer than the calyx, the lobes rounded. — Old fields, N. Y. and Ont., westw. and southw.; a relic of cultivation by the Indians. (Of unknown nativity.)

N. longiflòra Cav., with long slender tubular corolla, is said to escape from cultivation.

SCROPHULARIÀCEAE (Figwort Family)

Chiefly herbs (rarely trees), with didynamous stamens (or perfect stamens often only 2, rarely 5) inserted on the tube of the 2-lipped or more or less irregular corolla, the lobes of which are imbricated in the bud; fruit a 2-celled and usually many-seeded capsule, with the placentae in the axis; seeds anatropous or amphitropous, with a small embryo in copious albumen. Style single; stigma entire or 2-lobed. Leaves and inflorescence various, but the flowers not terminal in any genuine representatives of the family. — A large family of bitterish plants, some of them narcotic-poisonous.

Subfamily I. ANTIRRHINOÍDEAE

Upper lip or lobes of the corolla covering the lower in the bud (with occasional exceptions in *Mimulus*, etc.). Capsule usually septicidal.

Tribe I. VERBÁSCEAE. Corolla rotate. Flowers racemose. Leaves alternate.

1. **Verbascum.** Stamens 5, all with anthers, and 3 or all with bearded filaments.

Tribe II. ANTIRRHÍNEAE. Corolla tubular, with a spur or sac at the base below, the throat usually with a palate. Capsule opening by chinks or holes. Flowers in simple racemes or axillary. Lower leaves usually opposite or whorled. Stamens 4.

2. **Linaria.** Corolla spurred at base; the palate seldom closing the throat.
3. **Antirrhinum.** Corolla merely saccate or gibbous at the base; the throat nearly or quite closed by a conspicuous palate.

Tribe III. CHELÒNEAE. Corolla tubular or 2-lipped, neither spurred nor saccate below. Capsule 2-4-valved. Leaves opposite. Inflorescence usually compound, of small axillary spiked or racemed or umbel-like clusters or cymes, or when reduced to a single flower the peduncle mostly 2-bracteate. Stamens 4, and usually a rudiment of the fifth.

4. **Collinsia.** Corolla 2-cleft, the short tube saccate on the upper side; the middle lobe of the lower lip sac-like and inclosing the declined stamens.
5. **Scrophularia.** Corolla inflated, globular or subcylindric, with four erect lobes and one spreading one. Rudiment of the sterile stamen a scale on the upper lip.
6. **Pentstemon.** Corolla tubular. Sterile stamen about as long as the rest. Seeds wingless or but narrowly margined.
7. **Chelone.** Corolla tubular, inflated above. Sterile stamen shorter than the others. Anthers very woolly. Seeds winged.
8. **Paulownia.** Tree. Corolla tubular, inflated above, the lobes spreading. Sterile stamen none.

Tribe IV. GRATIÒLEAE. Corolla tubular, not saccate nor spurred. Capsule 2-valved. Flowers solitary in the axils of bracts or leaves; peduncles naked (or 2-bracteolate in no. 15). Leaves all or the lower ones opposite. No trace of a fifth stamen.

* Stamens 4, all anther-bearing and similar.

9. **Mimulus.** Calyx prismatic, 5-angled, 5-toothed. Corolla elongated.
10. **Conobea.** Calyx 5-parted, the divisions equal. Corolla short.
11. **Bacopa.** Calyx 5-parted, unequal, the upper division largest. Corolla short.
12. **Limosella.** Calyx 5-toothed. Corolla open-bell-shaped, 5-cleft, nearly regular. Leaves alternate or fasciceled, fleshy. Dwarf aquatic or marsh plant.

* * Anther-bearing stamens 2; usually also a pair of sterile filaments.

13. **Micranthemum.** Flowers minute. Calyx 4-toothed or cleft. Upper lip of corolla short or none. Filaments with an appendage; sterile pair none. Dwarf aquatic.
14. **Ilysanthes.** Calyx 5-parted. Stamens included, the sterile filaments protruded.
15. **Gratiola.** Calyx 5-parted. Stamens included, the sterile pair short or none.

Subfamily II. RHINANTHOÍDEAE

Under lip of the lateral lobes of the corolla covering the upper in the bud. Capsule commonly loculicidal.

Tribe V. DIGITÀLEAE. Corolla wheel-shaped, salver-shaped, or bell-shaped. Stamens 2 or 4, not approaching in pairs nor strongly didynamous; anthers 2-celled.

16. **Digitalis.** Calyx 5-parted. Corolla tubular or elongate-bell-shaped, declined. Stamens 4.
17. **Veronica.** Calyx 4(rarely 3–5)-parted. Corolla wheel-shaped or salver-shaped, almost regular. Stamens 2. Leaves chiefly opposite or whorled. Flowers racemed or axillary.
18. **Synthyris.** Calyx 4-parted. Corolla bell-shaped, 2–4-lobed, irregular. Stamens 2 or 4. Leaves alternate. Flowers racemed or spiked.

Tribe VI. GERARDÌEAE. Corolla with a spreading and slightly unequal 5-lobed limb. Stamens 4, approximate in pairs. Leaves opposite, or the uppermost alternate.

* Corolla bell-shaped to funnel-form; anthers 2-celled.

19. **Seymeria.** Stamens nearly equal. Tube of the corolla broad, not longer than the lobes.
20. **Gerardia.** Stamens strongly unequal, included.

* * Corolla salver-shaped; anthers 1-celled; flowers in a spike.

21. **Buchnera.** Calyx tubular, 5-toothed. Limb of the elongated corolla 5-cleft.

Tribe VII. EUPHRASÌEAE. Corolla tubular, obviously 2-lipped; the upper lip narrow, erect or arched, inclosing the 4 usually strongly didynamous stamens.

* Anther-cells unequal and separated; capsule many-seeded.

22. **Castilleja.** Calyx tubular, cleft down the lower, and often also on the upper, side. Upper lip of corolla elongated; the lower short, often very small.
23. **Orthocarpus.** Calyx tubular-campanulate, 4-cleft. Upper lip of corolla little longer and usually much narrower than the inflated lower one.

** Anther-cells equal; capsule 1–4-seeded.

24 **Melampyrum.** Calyx 4-cleft. Ovary 2-celled, 4-ovuled. Capsule flat, oblique.

*** Anther-cells equal; capsule many-several-seeded.

25. **Euphrasia.** Calyx 4-cleft. Upper lip of the corolla 2-lobed, and sides folded back. Capsule oblong.

26. **Odontites.** Calyx 4-cleft. Upper lip of corolla entire, and sides not folded back.

27. **Pedicularis.** Calyx not inflated. Capsule ovate or sword-shaped; seeds wingless.

28. **Rhinanthus.** Calyx inflated, ovate. Capsule orbicular; seeds winged.

29. **Schwalbea.** Calyx 5-toothed, very oblique, the uppermost tooth much the smallest.

1. VERBÁSCUM [Tourn.] L. Mullein

Calyx 5-parted. Corolla 5-lobed, open or concave; the lobes broad and rounded, a little unequal. Style flattened at the apex. Capsule globular, many-seeded. — Tall and usually woolly biennial herbs; the leaves of the stem sessile, often decurrent. Flowers in large terminal spikes or racemes, ephemeral, in summer. (The ancient Latin name, altered from *Barbascum.*)

1. V. Thápsus L. (Common M.) *Densely woolly throughout; stem tall and stout, simple, winged by the decurrent bases of the* oblong acute *leaves; flowers* yellow, very rarely white, *in a prolonged and very dense cylindrical spike;* lower stamens usually beardless. — Fields, rocky or gravelly banks, etc., a common weed. (Nat. from Eu.)

2. V. phlomoìdes L. Similar, but the *sessile leaves not at all or only slightly decurrent.* — Locally from N. E. to Ky. (Nat. from Eu.)

3. V. Blattària L. (Moth M.) *Green and smoothish,* or somewhat glandular-pubescent above, *slender;* lower leaves petioled, oblong, doubly serrate, sometimes lyre-shaped, the upper partly clasping; *raceme loose, the pedicels longer than the fruit;* filaments all bearded with violet wool. — Roadsides and waste places, w. Me. to Ont., and southw., local. — Corolla either yellow, or (in var. albiflòrum Ktze.) white with a tinge of purple. (Nat. from Eu.)

4. V. virgàtum Stokes. Similar to the preceding species, but somewhat more pubescent and glandular; *pedicels shorter than the fruit.* — Roadsides, Cape Breton I. (*Macoun*) and Cal. (Adv. from Eu.)

5. V. Lychnìtis L. (White M.) *Clothed with thin powdery woolliness;* stem and branches angled above; leaves ovate, acute, not decurrent, greenish above; *flowers* yellow, rarely white, *in a pyramidal panicle;* filaments with whitish wool. — Fields, etc., Mass. to N. J., Pa., and Ont., rather rare. (Adv. from Eu.)

2. LINÀRIA [Tourn.] Hill. Toadflax

Calyx 5-parted. Corolla spurred at base on the lower side (in abnormal specimens sometimes regularly 5-spurred). Capsule thin, opening below the summit by 1 or more pores or chinks. Seeds many. — Herbs, with at least all the upper leaves alternate (in ours), flowering in summer. (Name from *Linum,* the Flax, which some species resemble in their foliage.)

* *Erect or ascending, with narrow entire leaves.*

+ *Flowers yellow.*

1. L. vulgàris Hill. (Ramsted, Butter and Eggs.) Glabrous, *erect,* 1.3 *m. or less high;* leaves pale, linear or nearly so, extremely numerous, subalternate; *raceme dense;* corolla 2–3 cm. long or more, including the slender subulate spur; seeds winged. — Fields and roadsides, throughout our range. (Nat. from Eu.)

2. L. supìna Desf. *Diffusely branched at base,* 1–2.5 *dm. high;* leaves linear, the lower whorled; *racemes short, few-flowered;* corolla rather smaller than in the preceding. — Ballast and waste land along the coast. (Adv. from Eu.)

+ + Flowers blue or purple.

++ Corolla equaling or longer than the pedicels.

3. **L. canadénsis** (L.) Dumont. Slender, glabrous; flowering stems nearly simple, 2–8 dm. high; leaves flat, 2–4 mm. wide; racemes slender, naked, loose; corolla 1 cm. or less long, sometimes wanting (in reduced and cleistogamous flowers). — Sandy soil, N. B. and centr. Me., westw. and southw.

++ ++ Corolla much shorter than the slender axillary pedicels.

4. **L. mìnor** (L.) Desf. Low branched glandular annual, 1–3 dm. high; leaves spatulate-linear; corolla 5–8 mm. long. — Ballast and made land, Atlantic coast to Ont. and Mich. (Adv. from Eu.)

** * Annual, procumbent, much branched, with broad petioled veiny alternate leaves, and small purplish and yellow flowers from their axils.*

+ Pubescent.

5. **L. Elatìne** (L.) Mill. *Leaves hastate* or the lower ovate, much surpassed by the filiform peduncles; *calyx-lobes lanceolate*, acute; corolla 0.5–1 cm. long, including the subulate spur. (*Elatinoides* Wettst.) — Sandy banks, shores and waste places, Mass. to N. C. and Mo., rather rare. (Nat. from Eu.)

6. **L. spùria** (L.) Mill. Like the preceding, but with *roundish or cordate leaves* and *ovate or cordate calyx-lobes.* (*Elatinoides* Wettst.) — Occasional on ballast or waste grounds. (Adv. from Eu.)

+ + Glabrous.

7. **L. Cymbalària** (L.) Mill. (Kenilworth or Coliseum Ivy.) Leaves reniform-orbicular, 5–9-lobed; peduncles slender, becoming recurved in fruit; calyx-lobes lanceolate. (*Cymbalaria* Wettst.) — Waste places and ballast; also cultivated. (Adv. from Eu.)

3. ANTIRRHÌNUM [Tourn.] L. Snapdragon

Calyx 5-parted. Corolla-tube saccate or gibbous in front, not spurred; the lower lip 3-lobed, spreading, developed at the base into a prominent palate, which nearly or quite closes the throat; upper lip erect, shortly 2-lobed. Stamens 4, didynamous, included; anther-cells distinct and parallel. — Ours herbaceous plants with lance-oblong to linear entire leaves and axillary or racemose flowers. (Name from ἀντί, in the sense of *like*, and ῥίς, *a snout*, in reference doubtless to the peculiar form of the corolla.)

1. **A. Oróntium** L. Slender usually branched *annual*, pubescent or *smoothish; leaves linear;* calyx-lobes linear, exceeding the capsule; corolla purple or white, 1–1.6 cm. long. — Casual in fields, about dumping grounds, etc., rather rare. (Adv. from Eu.)

2. **A. màjus** L. *Perennial*, glandular-pubescent and somewhat *viscid; leaves lance-oblong;* calyx-lobes ovate or oblong, short; corolla crimson, white, or variegated, 2–3 cm. long. — Commonly cultivated, and occasionally found as an escape. (Introd. from Eu.)

4. COLLÍNSIA Nutt.

Calyx deeply 5-cleft. Corolla declined; upper lip 2-cleft, its lobes partly turned backward. Fifth stamen gland-like. Capsule 4–many-seeded. — Slender annuals or biennials, with party-colored flowers in umbel-like clusters, appearing whorled in the axils of the upper leaves. (Dedicated to *Zaccheus Collins*, Philadelphian botanist, 1764–1831.)

1. **C. vérna** Nutt. (Blue-eyed Mary.) Slender, 1.5–6 dm. high; lower leaves ovate, the upper ovate-lanceolate, clasping by the heart-shaped base, toothed; *whorls about 6-flowered; flowers long-peduncled; corolla blue and white, 1–1.5 cm. long, more than twice exceeding the calyx.* — Moist soil, Ont. and N. Y. to Ia., and southw. Apr.–June.

C. BICOLOR Benth., of Cal., differing in its very short-peduncled flowers, has been found "introduced" in a wooded ravine at Galesburg, Ill. (*C. Z. Nelson*).

2. **C. violàcea** Nutt. Similar to no. 1; *upper leaves lanceolate; corolla violet.* — Rich soil, w. Mo. and e. Kan. to Tex. Apr., May.

3. **C. parviflòra** Lindl. Small; lower leaves ovate or rounded, the upper oblong-lanceolate, mostly entire; *whorls 2–6-flowered; flowers short-peduncled;* the small blue and white *corolla 5–8 mm. long, slightly exceeding the calyx.* — Rich soil and limy gravel, Ont., n. Mich., and westw. May, June.

5. SCROPHULÀRIA [Tourn.] L. FIGWORT

Calyx deeply 5-cleft. Stamens declined, with the anther-cells transverse and confluent into 1. Capsule many-seeded. — Rank herbs, with mostly opposite leaves, and small greenish-purple or lurid flowers in loose cymes, forming a terminal slender panicle. (So called because a reputed remedy for *scrofula.*)

1. **S. marilándica** L. Perennial, 1–1.7 m. high, with knotted root and square stem, glandular-puberulent in the open *pyramidal inflorescence*, otherwise glabrous; leaves ovate to ovate-lanceolate, mostly acuminate, serrate or somewhat incised; dorsal lobes of the corolla suborbicular, little longer than the others; *rudimentary stamen brownish-purple; capsule thin, subglobose,* with short conical summit. (*S. nodosa*, var. Gray.) — Rich open woods, e. Mass. to S. C., Kan., and La. July–Sept.

2. **S. leporélla** Bicknell. Of similar habit, foliage, and pubescence; root more simple; *inflorescence slender, elongated;* dorsal lobes of the corolla broadly oblong, erect, considerably longer than the others; *rudimentary stamen yellowish-green; capsule ovoid-conical, of firmer texture.* — Rich open woods, N. B. and Que. to Minn., Mo., and Va. May–Sept.

S. AQUÁTICA L., with crenate oblong very obtuse leaves (often biauriculate at the base) and calyx-lobes with broad scarious margin, has been found upon ballast in N. Y., N. J., and Pa. (Adv. from Eurasia.)

6. PENTSTÈMON [Mitchell] Ait. BEARD-TONGUE

Calyx 5-parted. Corolla tubular, gradually or abruptly dilated in the throat, more or less 2-lipped; upper lip 2-lobed, the lower 3-cleft. Fertile stamens 4, declined at base, ascending above, the fifth sterile filament either naked or bearded. Seeds numerous. — Perennials, with opposite entire or toothed leaves, the upper sessile and mostly clasping. Flowers mostly showy, thyrsoid or in open racemose panicles. (Name from πέντε, *five*, and στήμων, in the sense of *stamen;* the fifth stamen being present and conspicuous, although sterile.)

a. Inflorescence viscid or glandular, at least minutely so; leaves toothed or entire *b.*
  b. Middle and lower internodes pubescent or at least finely puberulent *c.*
    c. Corolla slender, tubular or trumpet-shaped, without marked inflation of the throat.
      Middle and lower internodes somewhat loosely pubescent; panicle mostly loose and open; corolla-limb suberect, not widely expanding . . . . . 1. *P. hirsutus.*
      Middle and lower internodes minutely granular-puberulent; panicle mostly strict and racemiform; corolla-limb ringent or flaring . . . . . 2. *P. gracilis.*
    c. Corolla with a decidedly dilated ventricose or campanulate open throat.
      Corolla 3.5–5 cm. long; throat 2 cm. in diameter . . . . 3. *P. Cobaea.*
      Corolla 2–3 cm. long; throat about 1 cm. in diameter.
        Inflorescence loosely paniculate; capsules 6–8 mm. long . . 4. *P. canescens.*
        Inflorescence a strict dense racemiform panicle; capsules 10–12 mm. long . . . . . 5. *P. albidus.*
  b. Middle and lower internodes entirely smooth and glabrous.
      Corolla-limb subrotate, the lobes widely spreading . . . . 6. *P. tubiflorus.*
      Corolla-limb erect or but slightly spreading . . . . . 7. *P. laevigatus*
a. Inflorescence glabrous; leaves entire.
    Corolla with a distinct ventricose throat.
      Corolla 4–5 cm. long; stem-leaves oval to suborbicular . . . 8. *P. grandiflorus*
      Corolla 2.8–3.7 cm. long; stem-leaves ovate-lanceolate to narrowly oblong . . . . . 9. *P. glaber.*
    Corolla trumpet-shaped, about 2 cm. long; throat gradually dilated . 10. *P. acuminatus.*

1. **P. hirsùtus** (L.) Willd. *Stem* 2–9 dm. high, *covered with fine* and often crowded *spreading* whitish mostly gland-tipped *hairs;* leaves oblong to lanceolate, 5–10 cm. long, the lowest and radical ovate or oblong, usually denticulate; thyrse rather slender; *corolla* dull violet or purple (or partly whitish), *scarcely enlarged upward, the throat nearly closed by a villous palate;* sterile filament densely bearded. (*P. pubescens* Ait.) — Dry or rocky grounds, centr. Me. to Ga., westw. to Wisc. and Mo. May–July.

2. **P. grácilis** Nutt. *Stem* 2–4 dm. high, minutely *granular-pubescent;* stem-leaves mostly linear-lanceolate, the radical spatulate or oblong; inflorescence glandular-puberulent; *corolla tubular-funnel-form or nearly cylindrical with open throat*, lilac-purple or whitish. — Man. and Minn. to Mo., Okla., and westw. May–July.

3. **P. Cobaèa** Nutt. *Soft-puberulent*, 3–6 dm. high; leaves ovate or oblong, or the lower broadly lanceolate and the upper cordate-clasping, mostly sharp-toothed; thyrse short; *corolla large* (3.5–5 *cm. long*), *strongly ventricose*, dull purple or whitish. — Prairies, Mo. and Kan. to Tex.; reported from n. O. (*Hacker*). May, June.

4. **P. canéscens** Britton. Stem erect or somewhat decumbent, 3–7 dm. high, mostly simple to the inflorescence, *minutely granular-puberulent;* leaves oblong to lance-linear, the upper cordate-clasping, sometimes a little panduriform; inflorescence loosely paniculate, glandular-puberulent; *corolla about* 2.5 *cm. long*, pale purplish or nearly white, *with distinct proper tube, dilated somewhat ventricose throat, and ringent limb.* (Including *P. pallidus* Small, at least in part.) — Rocky banks, w. Va. to Mo. and Ga. May, June.

5. **P. álbidus** Nutt. Stems several from a branched caudex, erect or nearly so, 2–4 dm. high, *closely puberulent;* leaves lance-oblong to linear; *thyrse strict*, raceme-like; calyx densely viscid-pubescent; *corolla* 2–2.5 cm. long, white or purplish-tinged, perceptibly *dilated in the throat, the limb of ample roundish widely spreading lobes.* — Prairies, etc., w. Minn. to Assina., southw. to Col. and Tex.

6. **P. tubiflòrus** Nutt. *Wholly glabrous up to the glandular-puberulent inflorescence;* stem 5–10 dm. high; leaves oblong or ovate-lanceolate, entire or sparingly toothed, the floral shorter than the remote dense clusters of the virgate thyrse; *corolla* 1.5–2 cm. long, *trumpet-shaped, with gradually dilated throat and widely spreading limb*, white or whitish. — Low prairies, barrens, etc., Mo., Kan., and Ark.; also locally established in the Eastern States. May–July.

7. **P. laevigàtus** Ait. Stem 5–15 dm. high, *glabrous to the inflorescence;* leaves rather firm, somewhat glossy, the cauline ovate-oblong or lanceolate, 5–15 cm. long, with subcordate clasping base; thyrse rather open; calyx-lobes 3–7 mm. long; *corolla* 1.5–2.5 cm. long, white or tinged with purple, *gradually enlarged upward, the throat somewhat widely open but the limb scarcely spreading;* sterile filament thinly bearded above. (*P. Pentstemon* Britton.) — Moist or rich soil, Pa. to Fla., and westw.; also established in fields northw. June, July.

Var. **Digitàlis** (Sweet) Gray. Calyx-lobes 6–10 mm. long; *corolla* larger, 2–3 cm. long, more *abruptly inflated.* (*P. Digitalis* Nutt.; *P. calycosus* Small.) — Pa. to Ia., Mo., Ark., etc.; locally established northeastw.

8. **P. grandiflòrus** Nutt. *Glabrous and somewhat glaucous;* stem 5–10 dm. high; *leaves* thickish, the upper and floral *roundish*, all but the obovate radical ones *clasping or perfoliate;* pedicels short; *corolla large* (4–5 cm. long), *ventricose-campanulate*, lilac or lavender-blue; sterile filament hooked and minutely bearded at the apex. — Prairies, Ill. and Wisc. to Wyo. and Kan.; established locally in the Eastern States. May, June.

9. **P. glàber** Pursh. *Glabrous;* stems 3–8 dm. high; *leaves* mostly *oblong-lanceolate* or the upper ovate-lanceolate; *thyrse elongated*, the peduncles and pedicels very short; *corolla* 2.4–3.7 *cm. long*, bright blue to violet-purple, *dilated above;* anthers and apex of the sterile filament glabrous or sparsely hirsute. — Plains of e. Neb. and s. Dak. to Wash. and N. Mex. June–Aug.

10. **P. acuminàtus** Dougl. *Glabrous*, erect or ascending, 3 dm. high; *leaves* thickish, firm, very smooth and somewhat glaucous, *ovate-lanceolate to narrowly*

oblong; thyrse elongated, slender; corolla about 2 *cm. long, trumpet-shaped, with slender gradually expanded tube*, blue. — Sandy and rocky soil, Minn. to Tex., and westw. May–July.

7. CHELÒNE [Tourn.] L. Turtlehead. Snakehead

Calyx of 5 distinct imbricated sepals. The mouth of the corolla a little open; upper lip broad and arched, keeled in the middle, notched at the apex; lower woolly-bearded in the throat, 3-lobed at the apex, middle lobe smallest. Seeds many. — Smooth perennials, with upright branching stems, serrate leaves, and large white or purple flowers, which are nearly sessile in spikes or clusters, and closely imbricated with round-ovate concave bracts and bractlets. (Name from χελώνη, *a tortoise*, the corolla resembling in shape the head of a reptile.)

1. **C. glàbra** L. (Balmony.) Stem 0.5–2 m. high; *leaves narrowly to broadly lanceolate*, 0.5–2 dm. long, 1–4 cm. wide, gradually acuminate, serrate with sharp appressed teeth, narrowed at base usually into a very short petiole; *bracts not ciliate; corolla white, or tinged with rose.* — Wet places, Nfd. to Man., and southw. July–Sept.

2. **C. obliqua** L. Less strict or with spreading branches, 5–8 dm. high; *leaves broadly lanceolate to oblong*, 0.5–2 dm. long, sometimes laciniately serrate, more veiny and duller, acute or obtuse at base, mostly short-petioled; *bracts ciliolate; corolla deep and bright rose-color.* — Rich damp woods, etc., s. Ill. to Va and Fla.

3. **C. Lyòni** Pursh. *Leaves elliptic to broadly ovate, abruptly acuminate*, sharply serrate, *long-petioled*; bracts ciliolate; corolla rose-purple. — Mts. from Va. southw.

8. PAULÓWNIA Sieb. & Zucc.

Calyx 5-cleft. Corolla-tube enlarged upward, the 5 unequal lobes spreading. Stamens didynamous; sterile filament none. Seeds numerous, winged. — Tree, with large cordate pubescent petioled leaves and terminal panicles of large violet flowers. (Named for *Anna Paulowna*, a Russian princess.)

1. **P. tomentòsa** (Thunb.) Steud. (*P. imperialis* Sieb. & Zucc.) — Escaped from cultivation and established from N. Y. southw. (Introd. from Japan.)

9. MÍMULUS L. Monkey Flower

Calyx prismatic, 5-angled, 5-toothed, the uppermost tooth largest. Upper lip of corolla erect or reflexed-spreading, 2-lobed; lower spreading, 3-lobed. Stigma 2-lobed; lobes ovate. Seeds numerous. — Herbs, with opposite (rarely whorled) leaves, and mostly handsome flowers. (Diminutive of *mimus*, a buffoon, from the grinning corolla.)

* *Corolla violet-purple (rarely white); erect glabrous perennials; leaves feather-veined.*

1. **M. ríngens** L. Stem square, 1 m. or less high; *leaves oblong or lanceolate, pointed, clasping* by a heart-shaped base, serrate; peduncles longer than the flower; calyx-teeth taper-pointed, nearly equal; corolla personate, 2–4 cm. long. — Wet places, N. B. to Man., and southw. June–Sept.

2. **M. alàtus** Ait. Stem winged at the angles; *leaves oblong-ovate, tapering into a petiole;* peduncles shorter than the very short-toothed calyx; otherwise like the preceding. — Wet places, Ct. to s. Ont., Kan., and southw.

** *Corolla yellow.*

← *Leaves several-nerved and veiny, the upper sessile or clasping; calyx oblique, the uppermost tooth longest.*

3. **M. glabràtus** HBK., var. **Jamèsii** (T. & G.) Gray. Diffusely spreading, *smooth or smoothish;* stems creeping at base; *stem-leaves roundish or kidney-*

shaped, nearly sessile, equaling the peduncles; calyx ovoid, inflated in fruit and 7–10 mm. long; throat of corolla 1–2 cm. long, broad and open. (*M. Jamesii* T. & G.) — In water or wet places, usually in springs, Ont. to Ill., Wisc., Mo., and westw.

4. **M.** Langsdórfii Dohn. Smooth, suberect or decumbent; *stem-leaves oval, the lowermost long-petioled*, the upper much exceeded by the peduncles; fruiting calyx 1.5–2 cm. long; corolla 2.5–4 cm. long. (*M. guttatus* DC.) — Locally naturalized in brooks and meadows, Ct. and N. Y. (Introd. from the Pacific slope.)

← ← *Leaves feather-veined, none clasping; calyx-teeth nearly equal.*

5. **M. moschàtus** Dougl. (Musk Flower.) *Villous and viscid*, musk-scented; stems spreading or ascending; *leaves oblong-ovate, short-petioled*; corolla pale yellow. — Damp soil, especially by cold streams, Nfd. to N. Y., e. Pa., Ont., and Mich.; abundant in the Rocky Mts., whence perhaps introd. June–Sept.

10. CONÒBEA Aublet.

Upper lip of corolla 2-lobed, the lower 3-parted. Anthers approximate. Stigma 2-lobed, the lobes wedge-form. Seeds numerous. — Low branching herbs, with small solitary flowers. (Name unexplained.)

1. **C. multífida** (Michx.) Benth. Annual, diffusely spreading, much branched, minutely pubescent; leaves petioled, pinnately parted, divisions linear-wedge-shaped; peduncles naked; corolla greenish-white, scarcely longer than the calyx. — Along streams and shores, Ont. to Kan., and southw.; also adv. below Philadelphia. July–Sept.

11. BACÒPA Aublet. Water Hyssop

Calyx 5-parted; the uppermost division broadest, the innermost often very narrow. Upper lip of the corolla entire, notched or 2-cleft, and the lower 3-lobed, or the limb almost equally 5-lobed. Style dilated or 2-lobed at the apex. Seeds numerous. — Low herbs, flowering in summer; ours rather succulent perennials. (Said to be an aboriginal South American name.) Herpestis Gaertn. f. Moniera B. Juss. ex P. Br. Monniera B. Juss.

* *Corolla plainly bilabiate, the 2 upper lobes united to form the upper lip; leaves many-nerved.*

1. **B. acuminàta** (Walt.) Robinson. Erect or ascending, very leafy, glabrous; leaves pinnately veined, oblong to cuneate-lanceolate, 2–5 cm. long, serrate; pedicels equaling and the upper surpassing the leaves; corolla whitish or purplish. (*Gratiola* Walt.; *Monniera* Ktze.; *Herpestis nigrescens* Benth.) — Wet places, Md. to Fla. and Tex., chiefly near the coast, inland to s. Mo.

2. **B. rotundifòlia** (Michx.) Wettst. Nearly smooth, creeping; *leaves round-obovate, half-clasping*, 1–2.5 cm. long, entire, basally nerved; *peduncles twice or thrice the length of the calyx*; upper sepal ovate; corolla white or pale blue. (*Monniera* Michx.; *Herpestis* Pursh.) — Margins of ponds, Ill. to Minn., Neb., and southw.

3. **B. caroliniàna** (Walt.) Robinson. Stems hairy, creeping at base; *leaves ovate, clasping*, entire, basally nerved; *peduncles shorter than the calyx*; upper sepal heart-shaped; corolla blue. (*Obolaria* Walt.; *Monniera* Ktze.; *Herpestis amplexicaulis* Pursh.) — Margin of ponds, pine barrens, N. J. and Md. to La. — Aromatic when bruised.

* * *Corolla obscurely bilabiate, the limb subequally 5-lobed; stamens almost equal.*

4. **B. Monnièria** (L.) Wettst. Glabrous, prostrate and creeping; leaves spatulate to obovate-cuneate, entire or somewhat toothed, nearly nerveless, sessile; corolla pale blue. (*Herpestis* HBK.; *Monniera Monniera* Britton.) — River-banks and shores near the sea, Md. to Tex.

12. LIMOSÉLLA L. Mudwort

Calyx bell-shaped. Anthers confluently 1-celled. Style short, club-shaped. Capsule globular, many-seeded; the partition thin and vanishing. — Small annuals, growing in mud, usually near the seashore, creeping by slender runners, without ascending stems; the entire fleshy leaves in dense clusters around the simple 1-flowered naked peduncles. Flowers small, white or purplish. (Name from *limus*, mud, and *sella*, seat.)

1. **L. aquática** L., var. **tenuifòlia** (Wolf) Pers. Leaves with no blade distinct from the petiole, awl-shaped or thread-form. (*L. tenuifolia* Wolf.) — Brackish river-banks and shores, Lab. to N. J., and far n. and w., local. (Eurasia, etc.)

13. MICRÁNTHEMUM Michx.

Stamens anterior, the short filaments with a glandular (mostly basal) appendage; anthers 2-celled, didymous. Style short; the stigma 2-lobed. Capsule globular, thin, with an evanescent partition, several–many-seeded. — Small smooth depressed and tufted or creeping annuals, in mud or shallow water, with opposite and entire rounded or spatulate sessile leaves, and minute white or purplish flowers solitary in the axils of some of the middle leaves (usually one axil floriferous, that of the other leaf sterile). (Name formed of *μικρός*, *small*, and *ἄνθεμον*, *flower*.)

1. **M. micranthemoìdes** (Nutt.) Wettst. Branches ascending, 1–6 cm. high; leaves obovate-spatulate or oval; peduncles at length recurved, about the length of the calyx which is bell-shaped, 4-toothed, and usually split down on one side, in fruit becoming pear-shaped; middle lobe of the corolla linear-oblong, nearly twice the length of the lateral ones; appendage of the stamen nearly as long as the filament itself; stigmas subulate. (*M. Nuttallii* Gray.) — Tidal mud of rivers, N. J. to Fla. Aug.–Oct.

14. ILYSÁNTHES Raf. False Pimpernel

Upper lip of corolla short, erect, 2-lobed; lower larger and spreading, 3-cleft. Fertile stamens 2, included, posterior; anterior pair sterile, inserted in the throat, 2-lobed; one of the lobes glandular, the other smooth, usually short and tooth-like. Stigma 2-lobed. Capsule ovoid or ellipsoid, many-seeded. — Small and smooth annuals; the purplish flowers on filiform peduncles, or the upper racemed, produced all summer. (Name from *ἰλύς*, *mud*, or *mire*, and *ἄνθος*, *flower*.)

1. **I. dùbia** (L.) Barnhart. Much branched, spreading; stems 1–3 dm. long, at first simple, erect, leafy; leaves ovate, rounded, or oblong, usually crenate-toothed, mostly 1.8–3 cm. long, the upper partly clasping, the lower more or less narrowed at the base; *lower peduncles* about *as long as the subtending leaves or shorter; calyx-lobes* linear, about *equaling or slightly exceeding the ellipsoidal pod;* corolla 5–10 mm. long. (*I. riparia* Man. ed. 6, in part, and perhaps of Raf.; *I. attenuata* Small.) — Wet places, N. B., westw. and southw., common. (Adv. in France.)

2. **I. anagallídea** (Michx.) Robinson. More slender, diffuse, and usually smaller-leaved; leaves elliptic to ovate, commonly entire or nearly so, 3–20 (mostly about 10) mm. long; *peduncles long* and filiform, spreading-ascending, *even the lower ones much exceeding the subtending leaves; calyx-lobes somewhat shorter than the pod;* corolla as in the preceding. (*Gratiola* Michx.; *I. dubia* of Am. auth., not *Gratiola dubia* L.; *I. riparia* Raf.?) — Wet places, e. Mass., southw. and westw., frequent.

15. GRATÌOLA L. Hedge Hyssop

Narrow divisions of calyx nearly equal. Upper lip of corolla entire or 2-cleft, lower 3-cleft. Style dilated or 2-lipped at apex. Capsule 4-valved, many-seeded. — Low herbs, mostly perennials, some apparently annuals, with sessile leaves,

and usually with 2 bractlets at the base of the calyx. Flowering all summer; in wet or damp places. (Name from *gratia*, grace or favor, from supposed medicinal properties.)

§ 1. *Anthers with a broad connective, the cells transverse; stems mostly diffusely branched, or creeping at base, soft viscid-pubescent or smooth; corollas* 0.8–1.5 *cm. long; bractlets foliaceous, equaling the calyx.*

* *Sterile filaments minute or none; corolla whitish, with the tube yellowish.*

1. G. virginiàna L. Stem clammy-puberulent above, 1–3 dm. high; leaves lanceolate, with narrow base, acute, entire or sparingly toothed; *peduncles almost equaling the leaves* (1–2.5 cm. long); pod ovoid, 4–5 mm. long. — Wet or muddy places, local, centr. Me. and w. Que., westw. and southw. June–Aug.

2. G. sphaerocárpa Ell. Smooth, rather stout, 1.5–4 dm. high; leaves lance-ovate or oblong to oval-obovate, 2–5 cm. long, toothed; *peduncles scarcely longer than the calyx* and the large globular pod (6 mm. in diameter). — Wet places, N. J. to Mo., and southw. Apr.–June.

* * *Sterile filaments slender, tipped with a little head; leaves short* (1–2.5 *cm. long*).

3. G. viscòsa Schwein. *Clammy-pubescent or glandular; leaves ovate-lanceolate or oblong*, acute, toothed, mostly shorter than the peduncles; *corolla whitish, yellow within.* — Del. (*Commons*) to Ky., and southw.

4. G. aúrea Muhl. *Nearly glabrous; leaves lanceolate or oblong-linear, entire*, equaling the peduncles; *corolla golden-yellow* (rarely pale yellow or white), 1.2–1.8 cm. long. — Wet sandy shores, Me., w. Que., and Ont. to Va.

§ 2. *Anthers with no broad connective, the cells vertical; sterile filaments tipped with a head; hairy apparently annual plants, with erect rigid and more simple stems.*

5. G. pilòsa Michx. Leaves ovate or oblong, sparingly toothed, sessile, 1–2 cm. long; flowers nearly sessile; corolla white, 6–9 mm. long, scarcely exceeding the calyx. — Low ground, N. J. to Fla. and Tex.

16. DIGITÀLIS [Tourn.] L. Foxglove

Calyx 5-parted; the lobes often foliaceous. Corolla with a somewhat inflated tube and short scarcely spreading limb, declined. Stamens 4, didynamous, included in the corolla. — Tall herbs, with alternate or scattered entire or toothed leaves and showy racemose flowers. (*Digitalis*, of or belonging to the finger, as the fingers of a glove, which the tubular corollas have been thought to resemble.)

1. D. purpùrea L. Stoutish pubescent biennial; corolla purple to white, spotted, 4–5 cm. long. — Meadows and pastures, Cape Breton I.; also N. Y.; rather rare and local, a casual escape from gardens. (Introd. from Eu.)

17. VERÓNICA [Tourn.] L. Speedwell

The lateral lobes of the corolla or the lowest one commonly narrower than the others. Stamens 2, one each side of the upper lobe of the corolla, exserted; anther-cells confluent at the apex. Style entire; stigma single. Capsule flattened, obtuse or notched at the apex, 2-celled, few–many-seeded. — Chiefly herbs; flowers blue, flesh-color, or white. (Derivation doubtful; perhaps the flower of *St. Veronica.*)

* *Tall perennials, with elongate leaves; racemes terminal, dense, spiked; bracts very small; tube of the salverform corolla equaling or exceeding the calyx; both sometimes 5-cleft.*

1. V. virgínica L. (Culver's-root, Culver's Physic.) Smooth or rather downy; stem simple, straight, 0.5–2 m. high; *leaves whorled* in 4's to 7's, short

petioled, lanceolate, pointed, *finely serrate;* spikes panicled; *corolla small, nearly white, the tube much longer than the calyx and short limb;* stamens much exserted; *capsule oblong-ovate, not notched,* opening by 4 teeth at the apex, many-seeded. (*Leptandra* Nutt.)—Rich soil, w. Mass. and Ct. to Man., and southw. July, Aug.

2. V. LONGIFÒLIA L. Similar; stem puberulent; *leaves opposite or in* 3's, slender-petioled, narrowly lanceolate, *coarsely and doubly serrate;* spikes solitary or few; *corolla blue, the tube about equaling the calyx and limb; capsule suborbicular, flat, rounded or emarginate at apex.*—Cultivated, and sometimes found by roadsides, in thickets, and about old house-sites, N. S. to w. Que. and N. Y. (Introd. from Eu.)

3. V. BACHOFÈNII Heuffel. Like the preceding, but the *leaves triangular-ovate, cordate.*—Vicinity of Quebec. (Introd. from Eu.)

** *Corolla wheel-shaped, the tube short; capsule more or less notched, strongly flattened except in nos.* 4 *and* 5; *low or decumbent herbs.*

+ *Perennials, stoloniferous or rooting at base, with opposite usually serrate leaves; racemes axillary, mostly opposite; corolla pale blue.*

++ *Capsule turgid, orbicular, many-seeded.*

4. V. Anagállis-aquática L. (WATER S.) Smooth, creeping and rooting at base, then erect, 1–10 dm. high; *leaves sessile, most of them clasping by a heart shaped base, ovate-lanceolate,* acute, serrate or entire, 1 dm. or less long; pedicels spreading; corolla pale blue, with purple stripes; capsule slightly notched.—Brooks and ditches, Essex Co., Mass. (*Oakes*); w. N. E. to B. C., and southw. June–Aug. (Eurasia.)

5. V. americàna Schwein. (AMERICAN BROOKLIME.) Similar; *leaves lanceolate to elongate-ovate, acute or acutish, serrate, short-petioled;* mature *fruiting pedicels* very slender, 6–11 *mm. long.*—Brooks, ditches, etc., Nfd. to Alaska, s. to Va., W. Va., Great L. region, Neb., and in the Rocky Mts. June–Aug.

6. V. BECCABÚNGA L. (EUROPEAN BROOKLIME.) *Almost fleshy, prostrate* and strongly repent; *leaves oval or short-oblong, rounded at tip, crenate,* short-petioled; mature *fruiting pedicels* thickish, 4–5 *mm. long.*—Brooks and ditches about Quebec and near New York City. (Nat. from Eu.)

++ ++ *Capsule strongly flattened, several-seeded.*

7. V. scutellàta L. (MARSH S.) *Smooth,* slender and weak, 1–5 dm. high; *leaves sessile, linear or linear-lanceolate, acute, remotely denticulate; racemes several, very slender* and zizag; *flowers few and scattered,* on elongated spreading or reflexed pedicels; capsule very flat, much broader than long, notched at both ends or didymous.—Swamps and wet places, Nfd. to B. C., s. to N. Y., Wisc., and Cal. May–Aug. (Eurasia.) Var. VILLÒSA Schumacher. Stems villous.—Ont. and w. N. Y. to Wash.

8. V. officinàlis L. (COMMON S.) *Pubescent;* stem *prostrate,* rooting at base; *leaves short-petioled, obovate-elliptical or wedge-oblong, obtuse, serrate; racemes densely many-flowered;* pedicels shorter than the calyx; capsule obovate-triangular, broadly notched.—Dry hills and open woods, Nfd. to Ont., Mich., and southw. May–Aug. (Eurasia.)

9. V. CHAMAÈDRYS L. (BIRD'S-EYE.) *Stem very slender, pubescent* (at least in two lines), ascending from a creeping base; *leaves subsessile, ovate or cordate, incisely crenate; racemes loosely flowered, flexuous;* pedicels little longer than the 4-parted calyx; capsule triangular-obcordate.—Pastures, open woods, etc., N. S. to Ont. and O., local. May, June. (Nat. from Eu.)

10. V. TEÙCRIUM L. Stems pubescent, *stiff and upright,* 3–7 dm. high; *leaves subsessile, oblong,* coarsely toothed, pubescent; *racemes* more densely flowered, *strictly ascending; calyx unequally 5-parted;* corolla 1 cm. broad, bluish; capsules orbicular or oval.—Escaped from cultivation to roadsides, etc., N. E. (Introd. from Eu.)

← ← *Leaves opposite; flowers in a terminal raceme; the lower bracts leaf-like; capsules flat, several-seeded; perennials, mostly turning blackish in drying.*

11. V. alpìna L., var. unalaschcénsis C. & S. Stems tufted, erect, simple, 1–3 dm. high; *leaves elliptical*, or the lowest rounded, entire or toothed, *nearly sessile; raceme hairy, few-flowered, crowded;* capsule obovate, notched. (*V. Wormskjoldi* R. & S.) — By alpine brooks, Que., Me., N. H., and northw. July, Aug. (Eurasia.)

12. V. serpyllifòlia L. (Thyme-leaved S.) Much branched at the creeping base, *nearly smooth;* branches ascending and simple, 0.5–2 dm. high; *leaves ovate or oblong*, obscurely crenate, 1.5 cm. or less long, *the lowest petioled* and rounded, the upper passing into lanceolate bracts: *raceme loose, the rhachis and pedicels appressed-puberulent; corolla 3–4 mm. broad, whitish or pale blue, with deeper stripes;* capsule rounded, broader than long, obtusely notched, 3–4 mm. broad. — Damp grassy ground, Nfd. to Ont., and southw.; both indigenous and introduced. May–July. (Eurasia.)

13. V. humifùsa Dickson. *Stouter, 2–4 dm. high; leaves 1–2.5 cm. long; rhachis and pedicels pubescent with spreading viscid or gland-tipped hairs; corolla 0.5–1 cm. broad, deep blue; capsule 4–6 mm. broad.* (*V. serpyllifolia*, var. *borealis* Laestad.) — Springy places, Lab. and Nfd. to N. B., n. N. E., and N. Y.; Rocky Mts., etc. (Eu.)

← ← ← *Annuals; floral leaves like those of the stem (or somewhat reduced), the flowers appearing to be axillary and solitary, mostly alternate; corolla shorter than the calyx* (except in no. 17).

↔ *Flowers short-pediceled; floral leaves reduced.*

14. V. peregrìna L. (Neckweed, Purslane S.) Glandular-puberulent or *nearly smooth*, erect, 1–3 dm. high, branched; *lowest leaves petioled, oval-oblong, toothed*, thickish, the others sessile, obtuse; the upper oblong-linear and entire, longer than the almost sessile whitish flowers; *capsule orbicular, slightly notched*, many-seeded. — Waste and cultivated grounds, in damp soil, N. B. to Fla., and across the continent. Apr.–Oct. (Eu.)

15. V. arvénsis L. (Corn S.) Simple or diffusely branched, 0.5–4 dm. high, *hairy; lower leaves petioled, ovate, crenate;* the uppermost sessile, lanceolate, entire; *capsule inversely heart-shaped*, the lobes rounded. — Cultivated grounds, N. S. to B. C., and southw.; in N. E. and Pa. often in rocky woods as if indigenous; rather rare. (Nat. from Eu.)

↔ ↔ *Flowers long-pediceled in axils of ordinary leaves; seeds cup-shaped.*

16. V. agréstis L. (Field S.) Leaves round or ovate, crenate-toothed, the floral somewhat similar; calyx-lobes oblong; flowers small; *ovary many-ovuled*, but the *nearly orbicular and sharply notched capsule* 1–2-seeded. — Sandy fields, in the Maritime Provinces of Canada, and from the Middle States southw., chiefly near the coast, local. (Adv. from Eu.)

17. V. Tournefórtii C. C. Gmel. Leaves round or heart-ovate, crenately cut-toothed, 1–2.5 cm. long; flowers large, 1 cm. wide, blue; calyx-lobes lanceolate, widely spreading in fruit; *capsule obcordate-triangular, broadly notched*, 16–24-seeded. (*V. Buxbaumii* Tenore; *V. byzantina* BSP.) — Waste grounds, e. Que. to Ont., O., and N. Y. (Adv. from Eu.)

18. V. hederaefòlia L. (Ivy-leaved S.) *Leaves* rounded or heart-shaped, *3–7-toothed or -lobed;* calyx-lobes somewhat heart-shaped; flowers small; *capsule turgid, 2-lobed, 2–4-seeded.* — Shaded places, N. Y. to N. C. Apr.–June. (Adv. from Eu.)

18. SÝNTHYRIS Benth.

Stamens inserted just below the upper sinuses, occasionally with another pair from the other sinuses, exserted; anther-cells not confluent. Style slender; stigma simple. Capsule flattened, rounded, obtuse or notched, 2-celled (rarely 3-lobed and 3-celled), many-seeded, loculicidal; the valves cohering below with the axis. — Perennial herbs, with the simple stems beset with partly clasping

bract-like alternate leaves, the root-leaves rounded and petioled, crenate. (Name from *σύν, together*, and *θυρίς, a little door;* in allusion to the closed valves of the pod.)

1. S. Búllii (Eaton) Heller. Hairy; root-leaves ovate, heart-shaped; spike dense, 1–3 dm. long; corolla greenish-white or yellowish, not longer than the calyx, usually 2–3-parted. (*S. Houghtoniana* Benth.; *Wulfenia Houghtoniana* Greene.) — Oak barrens and prairies, Mich. to Minn., s. to O., Ind., Ill., and Ia. May, June.

19. SEYMÈRIA Pursh.

Calyx bell-shaped, deeply 5-cleft. Corolla with a short and broad tube, not longer than the 5 ovate or oblong nearly equal and spreading lobes. Anthers approximate by pairs, oblong, 2-celled; the cells equal and pointless. Capsule many-seeded. — Erect branching herbs, with the aspect of *Gerardia;* leaves mostly dissected or pinnatifid, the uppermost alternate and bract-like. Flowers yellow, interruptedly racemed or spiked. (Named for *Henry Seymer*, an English naturalist.) AFZELIA J. G. Gmel.

1. S. macrophýlla Nutt. (MULLEIN FOXGLOVE.) Rather pubescent, 1–1.5 m. high; leaves large, the lower pinnately divided, with the broadly lanceolate divisions pinnatifid and incised, the upper lanceolate; tube of the corolla incurved, very woolly inside, as are the filaments except at the apex; style short, dilated and notched at the point; capsule ovoid, pointed. (*Afzelia* Kzte.) — Shady river-banks, O. to Neb., s. to Tex. July, Aug.

20. GERÁRDIA [Plumier] L. GERARDIA

Calyx bell-shaped, 5-toothed or 5-cleft. Corolla swelling above, with more or less unequal lobes, the 2 upper usually rather smaller and more united. Stamens hairy; anthers approaching by pairs, 2-celled, the cells parallel, often pointed at base. Style elongated, mostly enlarged and flattened at the apex. Capsule globular or ovoid, pointed, many-seeded. — Erect branching herbs (more or less root-parasitic); stem-leaves opposite, or the upper alternate, the uppermost reduced to bracts and subtending 1-flowered peduncles, which often form a raceme or spike. Flowers showy, pink, purple, or yellow, in late summer and autumn. (Dedicated to the celebrated herbalist, *John Gerarde.*)

§ 1. DASÝSTOMA [Raf.] Gray. *Corolla yellow, the tube woolly inside, as well as the anthers and filaments; anthers alike, awn-pointed at base; leaves rather large, more or less incised or pinnatifid.*

* *Pubescence partly glandular and viscid; corolla pubescent outside.*

1. G. pediculária L. Annual or biennial, much branched, 1 m. or less high, very leafy, villous at base, puberulent above; leaves ovate-lanceolate, pinnatifid, and the lobes cut and toothed; pedicels glandular, about equaling the mostly serrate slightly glandular or glabrate calyx-lobes. (*Dasystoma* Benth.) — Dry copses, Me. to Ont., Minn., and W. Va.

Var. ámbigens Fernald. Stems glandular-villous above; pedicels and calyx usually villous. — Wisc. to N. C. and Mo. Passing to the more southern var. PECTINÀTA Nutt., with densely villous stems and leaves, and glandular-hispid calyx.

* * *No glandular pubescence; corolla glabrous outside; perennial.*

+ *Stems finely and closely pubescent.*

2. G. grandiflòra Benth. *Minutely downy;* stem much branched, 0.5–1 m. high; *leaves ovate-lanceolate, even the upper ones more or less cut or pinnatifid, the lower pinnatifid;* pedicels rather shorter than the calyx; corolla 4–5 cm. long, 4 times the length of the broadly lanceolate entire or toothed calyx-lobes; *capsule glabrous.* (*Dasystoma* Wood.) — Oak openings, Wisc. and Minn. to Tenn. and Tex.

Var. **serràta** (Torr.) Robinson. The upper leaves oblong, merely serrate or even quite entire. (Var. *integriuscula* Gray; *Dasystoma serrata* Small.) — Mo. and Kan. to La. and Tex. — Sometimes well marked, but not always so.

3. **G. flàva** L. (DOWNY FALSE FOXGLOVE.) *Pubescent with a fine close down;* stem 0.5–1 m. high, mostly simple; *leaves ovate-lanceolate or oblong, obtuse, entire, or the lower usually sinuate-toothed or pinnatifid; pedicels very short;* calyx-lobes oblong, obtuse, rather shorter than the tube; corolla 4–5-cm. long; *capsule pubescent.* (*Dasystoma* Wood.) — Open woods, s. Me. to Ont., Ia., and southw.

← ← *Stem glabrous.*

4. **G. virgínica** (L.) BSP. (SMOOTH FALSE FOXGLOVE.) *Glaucous,* 1–2 m. high, usually branching; *lower leaves commonly twice pinnatifid; the upper oblong-lanceolate, pinnatifid or entire; pedicels nearly as long as the calyx;* calyx-lobes lance-linear, acute, as long as the at length inflated tube; corolla 4–5 cm. long. (*Dasystoma* Britton; *G. quercifolia* Pursh.) — Dry woods, s. Me. to Minn., and southw.

5. **G. laevigàta** Raf. *Not glaucous;* stem 3–8 dm. high, mostly simple; *leaves lanceolate, acute, entire,* or the lowest obscurely toothed; *pedicels shorter than the calyx-tube;* corolla 2–3 cm. long. (*Dasystoma* Chapm.) — Oak barrens, etc., Pa. to Mich. and Mo., s. in the mts. to Ga.

§ 2. OTOPHÝLLA Benth. *Corolla purple (rarely white), naked within, as well as the very unequal filaments; anthers dissimilar, pointless, glabrous or sparingly hairy.*

6. **G. auriculàta** Michx. Rough-hairy; stem erect, nearly simple, 2–6 dm. high; *leaves lanceolate or ovate-lanceolate,* sessile, *the lower entire,* the others with an oblong-lanceolate lobe on each side at the base; *flowers nearly sessile in the axils,* 1.5–2 cm. long. — Low grounds and prairies, Pa. to Minn., s. to N. C. and Kan.

7. **G. densiflòra** Benth. More hispid and rough, very leafy; *leaves rigid, pinnately parted into 3–7 narrowly linear acute divisions,* those subtending the *densely spicate flowers* similar and crowded; corolla 2–3 cm. long. — Prairies, e. Kan. to Tex.

§ 3. EUGERÁRDIA Benth. *Corolla purple or rose-color (rarely white): calyx-teeth short; anthers alike, nearly pointless, pubescent; cauline leaves linear or narrower, entire.*

* *Perennial; leaves erect, very narrow; pedicels erect, as long as floral leaves.*

8. **G. linifòlia** Nutt. Glabrous, 6–9 dm. high, sparingly or paniculately branched; leaves flat, thickish, 2–3 mm. wide; calyx-teeth minute; corolla 2.5 cm. long, minutely pubescent outside, villous within and the lobes ciliate, anthers and filaments very villous. — Low pine barrens, Del. to Fla.

* * *Annuals; herbage blackish in drying* (except in nos. 15 and 17).

← *Pedicels little if at all longer than the calyx and capsule.*

↔ *Capsule ellipsoid, distinctly longer than thick.*

9. **G. áspera** Dougl. Sparingly or somewhat fastigiately branched, 3–6 dm. high; leaves linear, rough; pedicels often alternate, equaling or moderately exceeding the calyx; calyx-teeth triangular-lanceolate, about half as long as the tube; corolla 1.8–2.6 cm. long. — Plains and prairies, Mich. and w. Ind. to N. Dak., Col., and Ark.

↔ ↔ *Capsule subglobose.*

= *Flowers large; corolla 2.3–3.1 cm. long.*

10. **G. fasciculàta** Ell. Tall, 6–12 dm. high; *stem subterete, scabrous-puberulent; branches* virgate, elongated, ascending, *subfastigiate, mostly 10–16-flowered; leaves* narrowly linear, *with smaller ones fasicled in their axils;* pedicels shorter than the calyx; corolla about 2.5 cm. long, purple. — Sandy fields, low meadows and shores, Va. to Fla. and Tex.

11. **G. purpùrea** L. (PURPLE G.) *Stem* 3–8 dm. high, somewhat *angled*, nearly or quite *smooth; branches* long, widely *spreading*, usually flexuous, *mostly* 3–8-*flowered;* leaves linear, acute, rough-margined; calyx commonly exceeding the pedicel, its teeth sharp-pointed, from very short to half the length of the tube; corolla usually 2.6–3 cm. long, bright purple, very pubescent.—Low mostly sandy ground, e. Mass. to Fla. and Tex., near the coast; also westw. along the Great Lakes to Wisc.

= = *Flowers smaller; corolla* 1.4–1.8 *cm. long.*

12. **G. paupércula** (Gray) Britton. *Slender* erect annual, 1–6 dm. high; stem angled, glabrous or nearly so, subsimple or more often branched above; leaves narrowly linear, acute, scabrous, often with smaller ones fascicled in their axils; pedicels usually about equaling the globose capsules; *calyx-teeth deltoid-lanceolate, sharp-pointed;* corolla decidedly smaller than in the preceding species, 1.4–1.8 cm. long, lighter rose-purple, merely puberulent except at the hairy margin. (*G. purpurea*, var. Gray.)—Sterile soil, bogs, sandy shores, etc., N. S. to Man., and southw.

13. **G. marítima** Raf. (SEA-SIDE G.) Similar to the preceding, but somewhat *fleshy; leaves* linear, *obtuse or rounded* at the ends; *calyx-teeth* very short and *obtuse or rounded;* corolla 1–1.5 cm. long.—Salt marshes along the coast, s. Me. to Fla.

+ + *Pedicels usually exceeding the corolla; woolly anthers cuspidate at base.*

++ *Corolla-lobes rounded or merely emarginate; capsule subglobose.*

= *Corolla glabrous within.*

a. Leaves flat, linear to lanceolate, much blackened in drying.

14. **G. tenuifòlia** Vahl. (SLENDER G.) *Leaves narrowly linear*, acute, the floral ones mostly like the others; calyx-teeth very short, acute; *capsule globular;* corolla 1–1.5 cm. long, rose-purple, the upper lip somewhat arched. (*G. Gattingeri* Small.)—Low or dry ground, w. Me. and w. Que. to Neb., Fla., and Tex. Var. MACROPHÝLLA Benth. Stouter; larger leaves 3–5 cm. long, and 4–5 mm. wide, scabrous; pedicels ascending; calyx-teeth larger. (*G. Besseyana* Britton.)—Ct. to Ont., N. Mex., and the Rocky Mts.

b. Leaves filiform or with revolute margins, slightly blackened in drying.

15. **G. Skinneriàna** Wood. Slender, 2–5 dm. high, with ascending branches, the slightly margined angles roughish; leaves hispidulous-scabrous; pedicels rather stiffly ascending, 1–4 cm. long; calyx greenish, the lance-deltoid lobes nearly one third as long as the tube; corolla 10–13 mm. long, rose-color; capsule globose-ovoid. (*G. tenuifolia*, var. *asperula* Gray.)—Dry woods and hills, Ont. to Minn., Tenn., and Mo.

= = *Corolla villous in the throat.*

16. **G. setàcea** Walt. Slender, 3–6 dm. high, with strongly ascending branches; leaves setaceous-linear, often revolute, somewhat darkened in drying; pedicels capillary, 1–2 cm. long; calyx green, with minute subulate teeth; corolla rose-purple, 2 cm. long, ventricose above the slender exserted tube, the lobes wide-spreading. (*G. Holmiana* Greene.)—Sandy barrens, D. C. to Fla. and Tex., mostly near the coast.

++ ++ *Corolla-lobes obcordate; capsule ellipsoid-ovoid.*

17. **G. parvifòlia** Chapm. Rigid, 0.5–5 dm. high, with stiff upright angled branches; leaves linear-subulate, rather rigid, not darkened in drying; inflorescence subracemose, the floral leaves greatly reduced; calyx whitish-green, nervose, with short subulate teeth; corolla about 1 cm. long, bright pink, the lobes all spreading; capsule much exceeding the calyx. (*G. Skinneriana* Man. ed. 6, not Wood; *G. decemloba* Greene.)—Sandy soil, near the coast, Mass. to Fla. and La.; and apparently in the Miss. basin.

21. BUCHNERA L. Blue Hearts

Calyx obscurely nerved. Corolla with a straight or curved tube and an almost equally 5-cleft limb, the lobes oblong or wedge-obovate, flat. Stamens included; anthers one-celled (the other cell wanting). Style club-shaped and entire. Capsule 2-valved, many-seeded. — Perennial rough-hairy herbs (doubtless root-parasitic), turning blackish in drying, with opposite leaves, or the uppermost alternate; the flowers opposite in a terminal spike, bracted and with 2 bractlets. (Named in honor of *J. G. Buchner*, an early German botanist.)

1. **B. americàna** L. Rough-hairy; stem wand-like, 3–8 dm. high; lower leaves obovate-oblong, the others ovate-oblong to linear-lanceolate, sparingly and coarsely toothed, veiny; spike interrupted; calyx longer than the bracts, one third the length of the deep-purple corolla (2 cm. long). — Moist sandy ground, N. J. to w. N. Y., s. Ont., Minn., and southw. June–Aug.

22. CASTILLÈJA Mutis. Painted Cup

Divisions of the calyx entire or 2-lobed. Tube of the corolla included in the calyx; its upper lip (*galea*) keeled, flattened laterally. Anther-cells oblong-linear, the outer fixed by the middle, the inner pendulous. Capsule many-seeded. — Herbs (root-parasitic), with alternate entire or cut-lobed leaves; the floral ones usually dilated, colored, and more showy than the yellow or reddish spiked flowers. (Dedicated to *Domingo Castillejo*, a Spanish botanist.)

1. **C. coccínea** (L.) Spreng. (Scarlet P.) Hairy biennial or annual; stem simple; root-leaves clustered, mostly entire, obovate or oblong; those of the stem incised; the floral 3–5-cleft, bright scarlet toward the summit (rarely yellow); *calyx* about the length of the pale yellow corolla, *equally cleft both sides, the lobes quadrate-oblong, entire or retuse.* — Low sandy ground, Mass. to Man., s. to Va., Tenn., and Tex.

2. **C. pállida** (L.) Spreng., var. **septentrionàlis** (Lindl.) Gray. Perennial, smooth or sparingly hairy, at the summit woolly; *leaves mainly entire*, the lower linear, upper broader; the floral oblong or obovate, greenish-white, varying to yellowish, purple, or red; *calyx equally cleft, the lobes oblong or lanceolate, 2-cleft;* corolla 1.5–2.5 cm. long, the *galea decidedly shorter than the tube*, not over 2 or 3 times as long as the lip. (*C. acuminata* Spreng.) — Damp gravelly or rocky banks, Lab., Nfd., and westw., s. to the St. John R., the mts. of n. N. E., the Great Lakes, Minn., and the Black Hills. June–Aug.

3. **C. sessiliflòra** Pursh. Perennial, 1.5–3 dm. high, very leafy, cinereous-pubescent; leaves mostly 3–5-cleft, with narrow diverging sometimes cleft lobes; *the floral* similar or broader, *not at all colored; calyx deeper cleft in front*, the narrow lobes deeply 2-cleft; corolla 3–4 cm. long, *the short galea but twice as long as the slender-lobed lip.* — Prairies, Man. to Ill., Mo., Tex., and the Rocky Mts. May–July.

23. ORTHOCÁRPUS Nutt.

Corolla with the upper lip (*galea*) little longer and usually much narrower than the inflated 1–3-saccate lower one. Otherwise nearly as *Castilleja*. (Name from ὀρθός, *upright*, and καρπός, *fruit*.)

1. **O. lùteus** Nutt. Annual, pubescent and hirsute, sometimes viscid, erect, 1.5–4 dm. high; leaves linear to lanceolate, occasionally 3-cleft; spike dense; bracts broader, mostly 3-cleft, about equaling the flowers, not colored; corolla golden-yellow, 1 cm. long, 2–3 times as long as the calyx. — Plains, n. Minn., Man., and westw.

24 MELAMPÝRUM [Tourn.] L. Cow Wheat

Calyx bell-shaped, sharply cleft. Tube of corolla cylindrical, enlarging above; upper lip compressed, straight in front; lower erect-spreading, biconvex, 3-lobed at apex. Anthers approximate, oblong, nearly vertical, hairy; the cells minutely

pointed at base. Capsule 1–4-seeded. — Erect branching annuals, with opposite leaves, the lower entire, the upper mostly toothed at base. Flowers solitary in the upper axils. (Name from *μέλας*, *black*, and *πυρός*, *wheat;* from the color of the seeds of some species.)

1. **M. lineàre** Lam. Leaves linear-lanceolate to narrow-ovate, short-petioled, the floral ones like the lower, or truncate at base and beset with a few bristly teeth; calyx-teeth not half the length of the slender tube of the pale greenish-yellow or purplish corolla (1 cm. long); seeds white. (*M. americanum* Michx.; *M. latifolium* Muhl.) — Open woods, N. S. and Que. to B. C., s. to Ga., Tenn., and Ia. June–Sept.

25. EUPHRÀSIA [Tourn.] L. Eyebright

Calyx tubular or bell-shaped, 4-cleft. Upper lip of the corolla erect, scarcely arched, 2-lobed, and the sides folded back; lower lip spreading, 3-cleft, the lobes obtuse or notched. Anther-cells pointed at the base. Capsule flattened. — Herbs, with opposite toothed or cut leaves. Flowers small, spiked. (Name *εὐφρασία*, *cheerfulness*, in allusion to its reputed medicinal properties.)

* *Flowers very small, borne in a compact leafy head or very short subcapitate raceme; stems filiform, normally simple; corolla dorsally 3–4 mm. long; dwarf arctic-alpine species.*

1. **E. Oakèsii** Wettst. *Leaves* ovate-orbicular, bluntly sinuate-toothed, *grayish-pubescent beneath; corolla white or nearly so,* with purple or violet veins and yellow eye. — Open stony ground, White Mts. of N. H., near Mt. Monroe and at the head of Oakes Gulf; Mt. Katahdin, Me.

2. **E. Williámsii** Robinson. *Leaves* much as in the preceding but *green and glabrous except near the margin; corolla brownish-purple,* with deeper colored veins and yellow eye. — Slopes of Mt. Washington, N. H., from the "Alpine Garden" to "Cape Horn."

** *Flowers small (corolla 3–4 mm. long dorsally), borne in open racemes; stems usually branched.*

3. **E. Rándii** Robinson. Leaves ovate to flabelliform, bluntly 9–11-toothed, finely pubescent upon both surfaces; corolla varying from deep violet to roseate or cream-colored, with violet veins and yellow eye. — In humus and damp spots, along the coast, Nfd. and e. Que. to Knox Co., Me. (*S. Plaisted*).

Var. **Farlòwii** Robinson has smaller grayish-pubescent 5–7-toothed leaves (only 2–4 mm. long). — Dry crests of sea-cliffs, Nfd.; Dog I., Eastport, Me.

*** *Flowers larger; corolla dorsally 5–7 mm. long, white, with lavender or purple veins and yellow eye.*

4. **E. árctica** Lange. Simple or branched, 4–12 cm. or more in height; *leaves conspicuously pubescent* upon both surfaces, the cauline ovate, rather bluntly toothed, the floral flabelliform, more sharply toothed; *corolla with pale lavender veins, the lobes of the lower lip nearly parallel.* (*E. latifolia* Pursh, as to plant, but not as to name-bringing synonym; *E. hirtella* Robinson, not Jord.) — Calcareous soil, Lab. to n. Me., L. Superior, and Arctic Am.

5. **E. americàna** Wettst. Simple or more often with elongated strongly ascending branches, 1–3 dm. tall, *flowering for the most part above the middle; leaves essentially glabrous,* the larger 8–14 mm. long, the lateral teeth awn-pointed; bracts about 7-toothed; calyx usually purple-nerved; *corolla* relatively large and showy, 8 *mm. long, somewhat suffused with purple or crimson and marked with deep purple lines, the lateral lobes of the lower lip strongly divergent.* — Damp open places, Nfd. and e. Que., along the coast to Lincoln Co., Me.

6. **E. canadénsis** Townsend. Similar, usually smaller and more diffuse, mostly *flowering from below the middle,* the elongated spikes dense; larger leaves 4–9 mm. long; bracts 9–11-toothed, the teeth setose-tipped; calyx green, the teeth aristate; *corolla 6–7 mm. long, white, with bluish or lavender veins and yellow eye.* (*E. americana*, var. Robinson.) — Dry grassy or rocky places, from the lower St. Lawrence to N. S., e. Me., and n. N. H.

26. ODONTÌTES [Rivinius] Ludwig.

Calyx equally cleft. Corolla with upper lip entire and sides not folded back. Otherwise much as *Euphrasia.* — Herbs, with opposite sessile leaves, and subsessile flowers in the upper axils and in a terminal leafy spike. (*Odontitis*, an ancient plant-name from ὀδούς, *tooth*, applied to some herb used for tooth-ache.)

1. O. RÙBRA Gilib. Stem 1–4 dm. high, from an annual root, branching, scabrous-pubescent; leaves oblong-lanceolate, coarsely and remotely serrate; spikes elongated, loosely-flowered; corolla small, rose-red. (*Bartsia Odontites* Huds.; *Odontites Odontites* Wettst.) — Fields, roadsides, etc., coast of Me., N. B., and N. S.; rarely in the interior. (Nat. from Eu.)

27. PEDICULÀRIS [Tourn.] L. LOUSEWORT

Calyx various. Corolla strongly 2-lipped; the upper lip flattened, often beaked at the apex; the lower erect at base, 2-crested above, 3-lobed; lobes commonly spreading, the lateral ones rounded and larger. Anthers transverse; the cells pointless. Capsule mostly oblique, several-seeded. — Perennial herbs, with chiefly pinnatifid leaves (the floral bract-like) and rather large flowers in a spike. (Name from *pediculus*, a louse; of no obvious application.)

* *Small-leaved annual or biennial, mostly branched, bearing axillary and terminal flowers.*

1. P. palústris L. Essentially glabrous, 2–6 dm. high; leaves lanceolate, 2–5 cm. long, pinnately parted, with small crenate oblong segments; calyx-lobes cristate; corolla 1–1.5 cm. long, purplish and rose-color (rarely white), the tube longer than the lips. (*P. parviflora* Britton, not Sm.) — Marshes and wet places, Temiscouata Co. to Gaspé Co., Que., Nfd., and northw. (Eu.)

* * *Large-leaved perennials; simple or somewhat branched, with terminal spikes.*

2. P. canadénsis L. (COMMON L., WOOD BETONY.) Hairy; stems simple, clustered, 1.5–4 dm. high; *leaves scattered, the lowest pinnately parted, the others half-pinnatifid;* spike short and dense; *calyx split in front, otherwise almost entire*, oblique; *upper lip of the* dull greenish-yellow and crimson *corolla hooded, incurved*, 2-toothed under the apex; *capsule flat, somewhat sword-shaped.* — Copses and banks, N. S., centr. Me., and w. Que. to Man., and southw. May, June.

3. P. lanceolàta Michx. Stem upright, 3–9 dm. high, nearly simple, mostly smooth; *leaves partly opposite, oblong-lanceolate, doubly cut-toothed;* spike crowded; *calyx 2-lobed*, leafy-crested; *upper lip of the* pale yellow *corolla incurved* and bearing a short truncate beak at the apex, the lower erect, so as nearly to close the throat; *capsule ovate, scarcely longer than the calyx.* — Swamps, Mass. to Ont. and Man., s. to Va., O., and Neb. Aug., Sept.

4. P. Furbíshiae Wats. Tall (5–9 dm. high), pubescent or glabrate; *leaves* lanceolate, *pinnately parted and the short oblong divisions pinnatifid-incised*, or the upper simply pinnatifid and the lobes serrate, silvery-margined; bracts ovate, laciniate-dentate; *calyx 5-lobed*, the lobes rather unequal, linear-lanceolate, entire or toothed; *upper lip of corolla straight* and beakless, the truncate apex bicuspidate, the lower erect, truncately 3-lobed; *capsule broadly ovate.* — Banks of the St. John, Me. and N. B. July, Aug.

28. RHINÁNTHUS L. YELLOW RATTLE

Calyx membranaceous, flattened, much inflated in fruit, 4-toothed. Upper lip of corolla arched, ovate, obtuse, flattened, entire at the summit, but with a dark tooth on each side below the apex; lower lip 3-lobed. Anthers approximate, hairy, transverse; the cells pointless. Capsule orbicular, flattened. Seeds orbicular, winged. — Annual upright herbs, with opposite leaves; the yellow or yellowish flowers crowded in a one-sided leafy-bracted spike. (Name composed

of ῥίν, *a snout*, and ἄνθος, *a flower*, from the beaked upper lip of species once united with this genus.)

Teeth of the upper lip of the corolla elongate, 1.5–2 mm. long . . . . 1. *R. major.*
Teeth of the upper lip broad and low, less than 1 mm. long.
Branches of the stem, when present, short and scarcely developed at flowering season, later if elongating bearing only reduced flowers.
Upper part of the stem marked with fine black lines; upper lip of corolla with purplish teeth, lateral lobes of the lower lip with a black spot at base . . . . . 2. *R. Crista-galli.*
Stem green, without black lines; corolla yellow throughout . . . 3. *R. oblongifolius.*
Branches of the stem in well developed plants elongate at flowering season, their flowers like those of the primary inflorescence.
Upper part of the stem marked with fine black lines; upper lip of corolla with bluish teeth, lower lip with brown markings . . . . . 4. *R. stenophyllus.*
Stem green, without black lines; corolla yellow throughout, the teeth of the upper lip whitish-yellow . . . . . 5. *R. Kyrollae.*

1. R. MÀJOR Ehrh. Simple or with numerous *long branches*, 2–8 dm. high; *stem with conspicuous black lines above*, essentially glabrous, *the branches mostly without axillary fascicles;* leaves lanceolate, the teeth subappressed; *bracts* glabrous, all but the lowest pale, broadly triangular, the tip prolonged, *their lowest lance-attenuate teeth 5 mm. long;* calyx glabrous except for the slightly scabrous margin; *corolla 2 cm. long*, the tube slightly curved, *the purple teeth of the upper lip horizontal.*—Damp fields, Plymouth, Mass. (*Oakes*). (Adv. or nat. from Eu.)

2. R. Crísta-gálli L. *Stems* 1–6 dm. high, *black-lineolate, at flowering season usually bearing short branches in all but the lower axils; these branches remaining conspicuously shorter than the primary stem, sometimes slightly elongating and bearing reduced flowers;* leaves lanceolate or lance-attenuate, crenate-dentate, the teeth subappressed; bracts glabrous, dark green, the lower lance-attenuate, the others elongate-deltoid, their lower lance-attenuate spreading-ascending crowded teeth (5 mm. long) much exceeding the appressed upper ones; calyx glabrous, green, often black-striate; corolla yellow, about 1.5 cm. long, its tube straight, *the teeth of the upper lip depressed, rounded, violet*, the lateral lobes of the lower lip with a black spot at base. (*R. minor* Ehrh.)—Dry gravelly thickets and sterile fields, near the coast, Nfd. and e. Que. to Ct.; indigenous northw., perhaps naturalized southw. (Eu.)—Plant strongly blackened in drying.

3. R. oblongifòlius Fernald. *Stems* 6–40 cm. high, *simple* or with few very short branches, *green; leaves oblong or linear-oblong, obtuse*, crenate-dentate, scabrous above, minutely pilose beneath; *bracts scabrous*, mostly shorter than the mature calyces, deltoid-ovate, laciniate-dentate, the lower deltoid-lanceolate teeth 3–4 mm. long; calyx glabrescent, the margins ciliate, in fruit 1.3–1.9 cm. long, greenish-yellow, often tinged with bronze; *corolla yellow*, 1–1.2 *cm. long.*—Lab. to alpine regions of Me., N. H., and n. N. Y.—Plant but slightly blackened in drying.

4. R. stenophýllus (Schur) Schinz & Thellung. *Stems* 2–6 dm. high, *black-lineolate*, commonly *with long arcuate-ascending branches with axillary fascicles;* leaves linear- to oblong-lanceolate, crenate-dentate, the teeth subappressed; *bracts glabrous, purple-tinged, the lower* like the foliage leaves and *subtending the remote flowers;* upper bracts subapproximate, triangular, equaling the calyx, their teeth lance-deltoid; *calyx purple-tinged*, glabrous, in fruit 1.5 cm. long; *corolla* 1.5 cm. long, *canary-yellow, turning brownish, the teeth of the upper lip blue-gray, the lower lip with brown markings.*—Boggy meadows and shores near the Gulf of St. Lawrence, Gaspé Co., Que., to N. S. (Eu.)

5. R. Kyróllae Chabert. *Stems* 3–7 dm. high, *green, not black-lineolate*, simple, or commonly *with long ascending branches without axillary fascicles;* leaves oblong-lanceolate, scabridulous, the teeth subappressed or slightly spreading; *bracts pale green*, lance-deltoid, with lance-acuminate spreading-ascending teeth; *calyx yellow-green*, in maturity 1.5 cm. long; *corolla* 8–13 mm. long, *light yellow, the teeth of the upper lip whitish-yellow.*—Gravelly thickets and meadows in calcareous districts, e. Que. to N. S. and n. Me.; Wash.

29. SCHWÁLBEA [Gronov.] L. Chaff-seed

Calyx tubular, 10–12-ribbed, 5-toothed; the posterior tooth much the smallest, the 2 anterior united higher than the others. Upper lip of the corolla oblong, entire; the lower little shorter, erect, 2-plaited, with 3 very short and broad obtuse lobes. Anther-cells parallel. Capsule ovate. Seeds linear, with a loose chaff-like coat. — A perennial minutely pubescent upright herb, 3–6 dm. high, with leafy simple stems terminated by a loose spike of rather large dull purplish-yellow flowers; leaves alternate, sessile, 3-nerved, entire, ovate or oblong, the upper gradually reduced to narrow bracts; pedicels very short, with 2 bractlets under the calyx. (Dedicated to *C. G. Schwalbe*, an obscure German botanist.)

1. **S. americàna** L. — Wet sandy soil, Mass. to La., near the coast. May–July.

LENTIBULARIÀCEAE (Bladderwort Family)

Small herbs (growing in water or wet places), with a 2-lipped calyx, and a 2-lipped personate corolla, 2 stamens with (confluently) 1-celled anthers, and a 1-celled ovary with a free central placenta, bearing several anatropous seeds, with a thick straight embryo, and no albumen. Corolla deeply 2-lipped; the lower lip larger, 3-lobed and with a prominent palate, spurred at the base in front; the palate usually bearded. Ovary free; style very short or none; stigma 1–2-lipped. Capsule often bursting irregularly. Scapes 1–few-flowered. — The following are the two principal genera.

1. **Utricularia**. Calyx-lobes mostly entire. Upper lip of corolla erect. Filaments strongly incurved. Foliage usually dissected, bladder-bearing.
2. **Pinguicula**. Calyx with upper lip deeply 3- and lower 2-cleft. Corolla-lobes spreading. Filaments straighter. Terrestrial, with entire rosulate leaves next the ground.

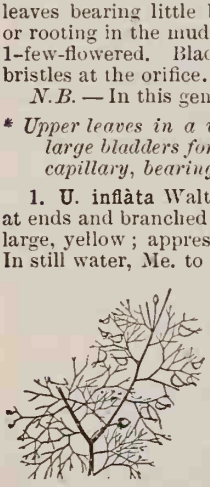
1. UTRICULÀRIA L. Bladderwort

Corolla personate, the palate on the lower lip projecting, often closing the throat. Anthers convergent. — Aquatic and immersed, with capillary dissected leaves bearing little bladders, which float the plant at the time of flowering; or rooting in the mud, and sometimes with few or no leaves or bladders. Scapes 1–few-flowered. Bladders furnished with a valvular lid and usually with a few bristles at the orifice. (Name from *utriculus*, a little bladder.)

N.B. — In this genus the figures of the leaves and flowers are on a scale of $\frac{2}{3}$.

* *Upper leaves in a whorl on the otherwise naked scape, floating by means of large bladders formed of the inflated petioles; the lower leaves dissected and capillary, bearing small bladders; rootlets few or none.*

1. **U. inflàta** Walt. Swimming free; bladder-like petioles oblong, pointed at ends and branched near apex, bearing fine thread-like divisions; flowers 3–10, large, yellow; appressed spur half the length of the corolla; style distinct. — In still water, Me. to Tex., mostly near the coast. July–Sept.



895. U. clandestina.

** *Scapes naked (except some small scaly bracts), from immersed branching stems, which commonly swim free, bearing capillary dissected leaves with small bladders on their lobes; roots few and not affixed, or none; mostly perennial, propagated from year to year by tuber-like buds.*

← *Cleistogamous flowers along the submersed copiously bladder-bearing stems.*

2. **U. clandestìna** Nutt. Leaves numerous on the slender immersed stems, several times forked, capillary;

scapes slender, 1 dm. high; lips of the yellow corolla nearly equal in length, the lower broader and 3-lobed, somewhat longer than the approximate thick and blunt spur.—Ponds, N. B. to Del. and Pa., chiefly near the coast. July, Aug. Fig. 895.

+ + *No cleistogamous flowers.*

++ *Pedicels recurved in fruit; corolla yellow.*

896. U. vulg. v. amer.

3. **U. vulgàris** L. (Greater B.) Immersed stems 3–10 dm. long, *crowded with 2–3-pinnately many-parted capillary leaves bearing many bladders;* scapes 5–12-flowered, 1–3 dm. long; *corolla closed*, 1–2 cm. broad, the sides reflexed; spur conical, rather shorter than the lower lip, thick and blunt.—Eurasia; n. w. Am. Represented with us by

Var. **americàna** Gray. Spur more slender and rather acute.—Common in ponds and slow streams, Nfd. to Minn., s. to Va. and Tex., and westw. June–Aug. Fig. 896.

897. U. minor.

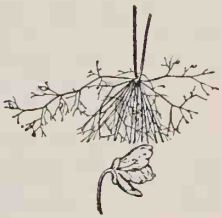
4. **U. mìnor** L. (Smaller B.) *Leaves scattered* on the thread-like immersed stems, 2–4 times *forked*, short; scapes weak, 2–8-flowered, 0.5–2 dm. high; *upper lip of the gaping corolla not longer than the depressed palate; spur very short and blunt, or almost none.*—Shallow water, e. Que. to B. C., s. to N. J., w. N. Y., Great L. region, Utah, and Cal. May–July. (Eu.) Fig. 897.

++ ++ *Pedicels erect in fruit, few and slender; corolla yellow.*

898. U. gibba.

5. **U. gíbba** L. *Scape* 2.5–10 cm. high, 1–2-*flowered*, at base furnished with very slender short branches, bearing sparingly dissected capillary root-like leaves and scattered bladders; corolla 6–8 mm. broad, the lips broad and rounded, nearly equal; the *lower lip* with the sides reflexed, *exceeding and approximate to the very thick and blunt conical gibbous spur.*—Shallow water, Me. to Fla. and Ala., near the coast; and from w. Vt. to Ont., Ill., and "Minn." July–Sept. Fig. 898.

6. **U. biflòra** Lam. *Scape* 0.5–1.3 dm. high, 1–3-*flowered*, at the base bearing somewhat elongated submersed branches with capillary root-like leaves and numerous bladders; *corolla* 8–13 *mm. broad, the spur oblong, equaling the lower lip;* seeds scale-shaped.—Ponds and shallow waters, Mass. to Fla.; and from Wisc. and Minn. to Ala. and Tex. Aug., Sept. Fig. 899.



899. U. biflora.

7. **U. fibròsa** Walt. *Leaves* crowded or whorled on the small immersed stems, several times forked, *capillary;* the bladders borne mainly along the stems; flowers 2–6, 1–1.3 cm. broad; lips nearly equal, broad and expanded, the upper undulate, concave, plaited-striate in the middle; *spur nearly linear, obtuse*, approaching and almost equaling the lower lip.—Shallow pools in pine barrens, L. I. and N. J. to Fla. and Ala. May–July.

900. U. intermedia.

8. **U. intermèdia** Hayne. *Leaves* crowded on the immersed stems, 2-*ranked*, 4–5 times forked, *rigid*, the divisions linear-awl-shaped, minutely bristle-toothed along the margins; *the bladders borne on separate leafless branches;* upper lip of corolla much longer than the palate; *spur conical-subulate, acute, appressed to and nearly as long as the very broad* (1–1.5 cm.) *lower lip.*—Shallow pools and streams, Nfd. to B. C., s. to N. J., Pa., Great L. region, Ia., and Cal. May–July. (Eurasia.) Fig. 900.

+++ *Pedicels erect in fruit, rather long; corolla violet-purple.*

9. **U. purpùrea** Walt. Leaves whorled along the long immersed free-floating

stems, petioled, decompound, capillary, bearing many bladders; flowers 2–4, 1–1.3 cm. wide; spur appressed to the 3-lobed 2-saccate lower lip of the corolla and about half its length. — Ponds, N. B. to Fla.; also n. Ind. and Mich. to Minn. July–Sept. Fig. 901.

901. U. purpurea.

* * * *Scape solitary, slender and naked, or with a few small scales, the base rooting in the mud or soil; leaves small, awl-shaped or grass-like, often raised out of the water, commonly few or fugacious; air-bladders few on the leaves or rootlets, or commonly none.*

← *Flower showy, purple, solitary; leaves bearing a few delicate lobes.*

10. **U. resupinàta** B. D. Greene. Scape 0.5–2 dm. high, 2-bracted above; leaves thread-like, on delicate creeping branches; corolla 1 cm. long, deeply 2-parted; spur slender-conical, very obtuse, shorter than the dilated lower lip and remote from it, both ascending, the flower resting transversely on the summit of the scape. — Sandy margins of ponds, N. B. to w. Ont., s. to Fla., and the Great L. region. Aug.

← ← *Flowers minute, purplish or whitish, solitary or few; leaves entire.*

11. **U. cleistógama** (Gray) Britton. Only 2–5 cm. high, bearing 1 or 2 evidently cleistogamous flowers (not larger than a pinhead); capsule becoming 2 mm. long. (*U. subulata*, var. Gray.) — Sandy and muddy shores, Cape Cod, and southw. Aug., Sept.

← ← ← *Flowers 2–10, yellow; leaves entire, rarely seen.*

↔ *Stem flexuous; flowers long-pediceled.*

12. **U. subulàta** L. Stem capillary, 2–20 cm. high; the raceme zigzag; *pedicels capillary; lower lip of the corolla flat or with its margins recurved, equally 3-lobed*, much larger than the ovate upper one; *spur oblong*, acute, straight, *appressed* to the lower lip, which it nearly equals in length. — Sandy swamps and pine barrens, Nantucket, Mass., to N. J., Fla., and Tex., near the coast. May–Sept.

↔ ↔ *Stem strict; flowers sessile or short-pediceled.*

= *Corolla conspicuously exceeding the calyx.*

13. **U. cornùta** Michx. Stem 0.5–3 dm. high, 1–5-flowered; *corolla 1.5–2 cm. broad, the lower lip large and helmet-shaped*, its center very convex and projecting, while the sides are strongly reflexed; upper lip obovate and much smaller; *spur awl-shaped, turned downward* and outward, 10–12 mm. long. — Peat-bogs or sandy shores, Nfd. to Ont. and Minn., s. to Fla. and Tex. June–Aug.

14. **U. júncea** Vahl. Stem 1–4 dm. high, 4–10-flowered; *pedicels short; corolla barely 1 cm. broad, lower lip obovate, consisting principally of the high-arched palate; spur awl-shaped*, about 6 mm. long. — Bogs and wet shores, Va., and southw. June–Sept.

= = *Corolla barely if at all exceeding the calyx.*

15. **U. virgátula** Barnhart. Very slender and strict, 2.5–25 cm. high; flowers 2–6, remotely spicate, rarely solitary; corolla usually shorter than the purplish calyx; the upper lip spatulate, emarginate; the lower laterally compressed, apiculate, hairy at throat; the conical spur 2–3 mm. long; capsule subglobose, 1.5–2 mm. in diameter, seemingly beaked by the persistent acuminate upper calyx-lobe. (*U. simplex* C. Wright, not R. Br.) — Shores of ponds, pine barrens of L. I. and N. J.; also Fla. to Miss. Aug., Sept. (Cuba.)

2. PINGUÍCULA [Tourn.] L. Butterwort

Upper lip of the calyx 3-cleft, the lower 2-cleft. Corolla with an open hairy or spotted palate, the lobes spreading. — Small and stemless perennials, growing

on damp rocks, with 1-flowered scapes; the broad and entire leaves soft-fleshy, mostly greasy to the touch (whence the name, from *pinguis*, fat).

1. **P. vulgàris** L. Leaves spatulate or elliptical; scape and calyx a little pubescent; lips of the violet corolla very unequal, the tube funnel-form; spur straightish. — Wet calcareous rocks, N. B. and Que. to n. N. Y., Mich., Minn., and far northw.; very local southw. June–Aug. (Eurasia.)

OROBANCHÀCEAE (Broom-rape Family)

Herbs (root-parasites) destitute of green foliage, gamopetalous, the ovary one-celled with 2 or 4 parietal placentae; pod very many-seeded; seeds minute, with albumen and a very minute embryo. Calyx persistent, 4–5-toothed or -parted. Corolla tubular, more or less 2-lipped, ringent, persistent and withering; upper lip entire or 2-lobed, the lower 3-lobed. Stamens 4, didynamous, inserted on the tube of the corolla; anthers 2-celled, persistent. Ovary free, ovoid, pointed with a long style; stigma large. Capsule 1-celled, 2-valved; each valve bearing on its face one placenta or a pair. Seeds very numerous, minute. — Low thick or fleshy herbs, bearing scales in place of leaves, lurid yellowish or brownish throughout. Flowers solitary or spiked.

* Flowers of two sorts, scattered along slender panicled branches.

1. **Epifagus.** Upper flowers sterile, with a tubular corolla; the lower fertile, with the coroll minute and not expanding. Bracts inconspicuous.

** Flowers all alike and perfect; stems mostly simple.

2. **Conopholis.** Flowers in a thick scaly spike. Calyx deeply cleft in front. Corolla 2-lipped. Stamens exserted.
3. **Orobanche.** Flowers sessile, spicate, thyrsoid-spicate, or pedicellate. Calyx 5-cleft. Corolla 2-lipped. Stamens included.

1. EPIFÀGUS Nutt. Beech-drops. Cancer-root

Flowers racemose or spiked; the upper sterile, with long filaments and style; the lower fertile, with a very short corolla which is forced off from the base by the growth of the pod; stamens and style very short. Calyx 5-toothed. Stigma capitate, a little 2-lobed. Capsule 2-valved at the apex, with 2 approximate placentae on each valve. — Herbs, slender, purplish or yellowish-brown, much branched, with small scattered scales, 1–6 dm. high. (Name from ἐπί, *upon*, and φηγός, *the Beech*, because it grows on the roots of that tree.) Leptamnium Raf. Epiphegus Spreng.

1. **E. virginiàna** (L.) Bart. Corolla of the upper (sterile) flowers whitish and purple, 1 cm. long, curved, 4-toothed. — Common under Beech-trees, parasitic on their roots; N. B. to Ont., Wisc., and southw. Aug.–Oct.

2. CONÓPHOLIS Wallr. Squaw-root. Cancer-root

Flowers with 2 bractlets at the base of the irregularly 4–5-toothed calyx, its tube split down on the lower side. Corolla tubular, swollen at base; upper lip arched, notched at the summit, the lower shorter, 3-parted, spreading. Stigma depressed. Capsule with 4 placentae, a pair on the middle of each valve. — Upper scales forming bracts to the flowers, regularly imbricate, not unlike those of a fir-cone (whence the name, from κῶνος, *a cone*, and φολίς, *a scale*).

1. **C. americàna** (L. f.) Wallr. — In woods, mostly under oaks, in clusters among fallen leaves; s. Me. to Mich., s. to Fla. and Tenn. May, June. — A singular plant, chestnut-colored or yellowish throughout, as thick as a man's thumb, 1–2.5 dm. high, covered with fleshy scales, which become dry and hard.

3. OROBÁNCHE [Tourn.] L. Broom-rape

Upper lip of corolla more or less spreading and 2-lobed, emarginate, or entire, the lower spreading, 3-lobed. Stigma broadly 2-lipped or crateriform. Capsule with 4 placentae, equidistant or contiguous in pairs. — Plants brownish, purplish, or whitish. Flowers (blue, purple, or yellowish) and naked or bracted stems minutely glandular-pubescent. (Name from *ὄροβος, vetch*, and *ἀγχόνη, strangler.*) Including Aphyllon [Mitchell] Gray.

* *Flowers spicate or thyrsoid-spicate, with 1–3 bracts at base of calyx; corolla 2-lipped, the upper lip generally 2-cleft.*

← *Each flower with 3 bracts (1 large and 2 small) at base of calyx.*

1. O. purpùrea Jacq. *Stem simple*, 1–2 dm. high, *bluish- or purplish-tinged; flowers deep violet; calyx 5-lobed;* corolla 2 cm. long, slightly bilabiate. — In lawns, on *Achillea*, Wingham, Ont. (*J. A. Morton*). (Adv. from Eu.)

2. O. ramòsa L. Much more slender and usually *freely branched, straw-colored; flowers yellow and pale blue; calyx 4-lobed;* corolla 1–1.5 cm. long. — Parasitic on tomato, New Brunswick, N. J. (*Halsted*); on hemp and tobacco, Ill. and Ky. (Adv. from Eu.)

← ← *Each flower with 1 or 2 bracts at base of calyx.*

3. O. mìnor Sm. Stem 1–3 dm. high, pubescent, pale yellowish-brown, or with purplish-tinged flowers in a rather *loose spike; calyx cleft before and behind almost or quite to the base*, the divisions usually 2-cleft; *corolla* 1–1.5 cm. long, the limb bluish, *with rounded lobes*, the upper lip emarginate. — Parasitic on clover, N. J. to Va. (Nat. from Eu.)

4. O. ludoviciàna Nutt. Simple or clustered, 1–3 dm. high; *flowers densely spicate* or thyrsoid, purplish, bracts 1 or 2; *calyx 5-cleft, nearly regular; corolla-lobes acutish.* (*Aphyllon* Gray.) — Sandy soil, Minn. to Ill., Tex., and westw.

* * *Flowers solitary on long naked scapes or peduncles, without bracts; corolla with a long curved tube and spreading 5-lobed limb.*

5. O. uniflòra L. (One-flowered Cancer-root.) *Stem subterranean or nearly so, very short*, scaly, often branched, each branch sending up 1–4 slender 1-flowered scapes 0.5–2 dm. high; *divisions of the calyx lance-awl-shaped*, half the length of the corolla, which is 1.5–2.5 cm. long, with 2 yellow bearded folds in the throat, and obovate lobes. (*Aphyllon* Gray; *Thalesia* Britton.) — Damp woodlands, Nfd. to Va. and Tex., and westw. to the Pacific. Apr.–July.

6. O. fasciculàta Nutt. *Scaly stem erect and rising 0.5–1 dm. out of the ground*, mostly longer than the crowded peduncles; *divisions of the calyx triangular, very much shorter than the corolla*, which has rounded short lobes. (*Aphyllon* Gray; *Thalesia* Britton.) — On *Artemisia, Eriogonum*, etc., sandy ground, L. Michigan; Minn., southw. and westw. Apr.–Aug. (Mex.)

BIGNONIÀCEAE (Bignonia Family)

Woody plants, gamopetalous, didynamous or diandrous, with the ovary commonly 2-celled by the meeting of the two parietal placentae or of a projection from them, many-ovuled; fruit a dry capsule, the large flat winged seeds with a flat embryo and no albumen, the broad and leaf-like cotyledons notched at both ends. Calyx 2-lipped, 5-cleft, or entire. Corolla tubular or bell-shaped, 5-lobed, somewhat irregular or 2-lipped, deciduous; the lower lobe largest. Stamens inserted on the corolla; the fifth or posterior one, and sometimes the shorter pair also, sterile or rudimentary; anthers of 2 diverging cells. Ovary free, bearing a long style, with a 2-lipped stigma. Leaves compound or simple, opposite, rarely alternate. Flowers large and showy. — Chiefly a tropical family.

1. **Tecoma.** Pod flattish contrary to the partition. Leaves compound, without tendrils.
2. **Catalpa.** Pod terete. Fertile stamens only 2. Trees; leaves simple.
3. **Bignonia.** Pod flattened parallel with the partition. Leaves compound, tendril-bearing.

1. TÉCOMA Juss. Trumpet-flower

Calyx bell-shaped, 5-toothed. Corolla funnel-form, 5-lobed, a little irregular. Stamens 4. Capsule 2-celled, with the partition at right angles to the convex valves. Seeds transversely winged. — Woody, with compound leaves, climbing by aërial rootlets. (Abridged from the Mexican name *tecomaxochitl.*)

1. **T. radicans** (L.) Juss. (Trumpet Creeper.) Leaves pinnate; leaflets 9–11, ovate, pointed, toothed; flowers corymbed; stamens not protruded beyond the tubular-funnel-form orange and scarlet corolla (6–8 cm. long); pod oblanceolate, 1–1.5 dm. long. — Moist soil, N. J. to s. e. Ia., s. to Fla. and Tex.: common in cultivation farther northw. Aug., Sept.

2. CATÁLPA Scop. Catalpa. Indian Bean

Calyx deeply 2-lipped. Corolla bell-shaped, swelling; the undulate 5-lobed spreading border irregular and 2-lipped. Fertile stamens 2, or sometimes 4; the 1 or 3 others sterile and rudimentary. Capsule very long and slender, nearly cylindrical, 2-celled, the partition at right angles to the valves. Seeds winged on each side, the wings cut into a fringe. — Trees, with ovate or cordate and mainly opposite leaves. (The aboriginal name.)

1. **C. speciòsa** Warder. (Catawba Tree, Cigar Tree.) A large and *tall tree, with thick bark;* leaves ample, heart-shaped, long-acuminate; *corolla 3.6–5 cm. long,* nearly white, *inconspicuously spotted,* with obconical tube and slightly oblique limb, the *lower lobe emarginate;* capsule thick. — Low rich woodlands, s. Ind. to Tenn., Mo., and Ark. May, June.

2. **C. bignonioìdes** Walt. A *low* much branched *tree, with thin bark; corolla smaller* (2.5–4 cm. long), *thickly spotted, with* oblique limb and entire *lower lobe;* capsule much thinner. (*C. Catalpa* Karst.) — Naturalized from N. Y. southw.; indigenous on the Gulf coast.

3. BIGNÒNIA [Tourn.] L.

Calyx truncate, or slightly 5-toothed. Corolla somewhat bell-shaped, 5-lobed and rather 2-lipped. Stamens 4, often with a rudiment of the fifth. Capsule linear, 2-celled. Seeds transversely winged. — Woody climbers. (Named for the *Abbé Jean-Paul Bignon*, court-librarian at Paris and friend of Tournefort.)

1. **B. capreolàta** L. (Cross-vine.) Smooth; leaves of 2 ovate or oblong leaflets and a branched tendril, often with a pair of accessory leaves in the axil resembling stipules; peduncles few and clustered, 1-flowered; corolla orange, 5 cm. long; pod 1.5 dm. long; seeds with the wing 4 cm. long. (*B. crucigera* L., in part.) — Rich soil, Va. to O. and Ill., s. to Fla. and La. Apr.–June. — Climbing tall trees; a transverse section of the wood showing a cross.

MARTYNIÀCEAE (Martynia Family)

Herbs, with chiefly opposite simple leaves, and flowers as of the Lentibulariaceae, *except in structure of ovary and fruit, the former being* 1-*celled, the latter fleshy-drupaceous, with wingless seeds and thick entire cotyledons.* Ovary (in ours) 1-celled, with 2 parietal intruded placentae expanded into 2 broad lamellae or united into a central columella. — Chiefly tropical.

1. MARTÝNIA L. Unicorn-plant

Calyx 5-cleft, mostly unequal. Corolla gibbous, bell-shaped, 5-lobed and somewhat 2-lipped. Fertile stamens 4, or only 2. Flesh of fruit at length falling away in 2 valves; inner part woody, terminated by a 2-horned beak

imperfectly 5-celled. Seeds several, with a thick roughened coat. — Low branching annuals, clammy-pubescent, exhaling a heavy odor; stems thickish; leaves simple, rounded; flowers racemed, large. (Dedicated to *Prof. John Martyn*, of Cambridge, England.)

1. **M. louisiàna** Mill. Leaves heart-shaped, oblique, entire or undulate, the upper alternate; corolla dull white or purplish, or spotted with yellow and purple; endocarp of the fruit crested on one side, long-beaked. (*M. proboscidea* Gloxin.) — River-banks and waste places, s. Ind., Ill., and Ia. to n. Mex.; also cultivated and naturalized northw.

ACANTHÀCEAE (Acanthus Family)

Chiefly herbs, with opposite simple leaves, didynamous or diandrous stamens inserted on the tube of the more or less 2-lipped corolla, the lobes of which are convolute or imbricated in the bud; fruit a 2-celled and few(4–12)-seeded capsule; seeds anatropous, without albumen, usually flat and supported by hooked projections of the placentae (retinacula). Flowers commonly much bracted. Calyx 5-cleft. Style thread-form; stigma simple or 2-cleft. Pod loculicidal, usually flattened contrary to the valves and partition. Cotyledons broad and flat. — Mucilaginous and slightly bitter, not noxious. A large family in the warmer parts of the world; represented in gardens by Thunbergia, which differs from the rest by the globular pod and seeds, the latter not on hooks.

* Corolla bilabiate, upper lip erect and concave, lower spreading; stamens 2.

1. **Dianthera.** Capsule obovate, flattened, 4-seeded.

** Corolla not obviously bilabiate, the 5 lobes broad and roundish, spreading; stamens 4.

2. **Ruellia.** Calyx-lobes mostly linear or lanceolate. Capsule 6–20-seeded.
3. **Dyschoriste.** Calyx-lobes long-filiform. Capsule 2–4-seeded.

1. DIANTHÈRA [Gronov.] L. Water Willow

Calyx 5-parted. Upper lip of corolla notched; the lower spreading, 3-parted, external in the bud. Anthers 2-celled, the cells separated and somewhat unequal. Capsule contracted at base into a short stalk. — Perennial herbs, growing in water or wet places, with entire leaves, and purplish flowers in axillary peduncled spikes or heads. (Name formed of *δίς*, *double*, and *ἀνθηρά*, *anther*, the separated cells giving the appearance of two anthers on each filament.)

1. **D. americàna** L. Stem 3–9 dm. high; *leaves linear-lanceolate*, elongated; spikes cylindric, dense, long-peduncled; corolla 1 cm. long, the lower lip rugose. — In water, w. Que. and Vt. to Wisc., s. to Ga. and Tex. July–Sept.

2. **D. ovàta** Walt. Slender, 1.5–4 dm. high; *leaves oblong or ovate-oblong;* peduncles mostly shorter than the leaves. — Swamps, etc., Va. to Fla. and Tex., inland to Mo.

2. RUÉLLIA [Plumier] L.

Calyx 5-parted. Corolla funnel-form, with spreading ample border, convolute in bud. Cells of the somewhat arrow-shaped anthers parallel and nearly equal. Capsule narrow, in ours somewhat flattened, contracted and seedless at base. Seeds with a mucilaginous coat, when wet exhibiting under the microscope innumerable tapering short bristles, their walls marked with rings or spirals. — Perennials, with large showy blue or purple flowers, sometimes also with small flowers precociously close-fertilized in the bud. Calyx often 2-bracteolate. (Named for the early French herbalist, *Jean Ruelle*.)

1. **R. ciliòsa** Pursh. *Hirsute* with soft whitish hairs, 3–9 dm. high; *leaves nearly sessile, oval* or ovate-oblong, 2.5–7 cm. long; flowers 1–3 and almost sessile in the axils; *tube of the corolla* 2.5–4 cm. long, fully *twice the length of*

the setaceous calyx-lobes; the throat short. — Dry ground, N. J. to Fla., w. to Mich., Neb., and Tex. June–Sept. Var. PARVIFLÒRA (Nees) Britton. Sparingly hirsute-pubescent or glabrate; leaves ovate-oblong, usually short-petioled, larger; tube of corolla little exceeding the hardly hirsute calyx. (Var. *ambigua* Gray.) — Va. and Ky. to Ala. — Appearing as if a hybrid with the next.

2. **R. strèpens** L. *Glabrous or sparingly pubescent*, 3–10 dm. high; *leaves narrowed at base into a petiole*, ovate, obovate, or mostly oblong, 0.7–1.5 dm. long; *tube of the corolla* (3–5 cm. long) little longer than the dilated portion, *slightly exceeding the lanceolate or linear calyx-lobes.* — Rich soil, Pa. to Wisc., s. to Fla. and Tex. July–Sept. Var. CLEISTÁNTHA Gray. Leaves commonly narrower and oblong; flowers for most of the season cleistogamous. (Var. *micrantha* Britton.) — Common with the ordinary form.

3. **R. pedunculàta** Torr. Puberulent, slender, 3–8 dm. high, the branches spreading; leaves ovate-oblong, 4–7 dm. long, short-petioled; *flowers* solitary or 3, *on slender peduncles* (1.5–5 cm. long) with 2 leaf-like bracts at the tip; corolla 3–5 cm. long, the tube slightly exceeding the subulate-filiform calyx-lobes. — Dry woods, Mo., and southw.

3. DYSCHORÍSTE Nees.

Calyx deeply 5-cleft or -parted. Corolla funnel-form, with ample limb, convolute in bud. Anthers mucronate or sometimes aristate at base. Ovules a single pair in each cell. Capsule oblong-linear. — Low branching perennials, pubescent or hirsute, with few proportionally large axillary nearly sessile flowers and blue corolla. (Name from δυσχώριστος, *hard to separate*, referring to the firmly coherent valves of the capsule.) CALOPHANES Don.

1. **D. oblongifòlia** (Michx.) Ktze. Stems usually erect and simple, 1.5–4 dm. high; leaves from narrowly oblong to oval, very obtuse, sessile, 1.5–3 cm. long; corolla blue, sometimes purple-dotted or mottled, seldom 2.5 cm. long; calyx-lobes nearly distinct, filiform-setaceous, hirsute. (*Calophanes* Don.) — Pine barrens, s. Va to Fla.

PHRYMÀCEAE (LOPSEED FAMILY)

A perennial herb, with slender branching stems, and coarsely toothed ovate leaves, the lower long-petioled; the small opposite flowers in elongated and slender terminal spikes, strictly reflexed in fruit. Corolla purplish or rose-color. Calyx cylindrical, 2-lipped; the upper lip of 3 bristle-awl-shaped teeth; the lower shorter, 2-toothed. Corolla 2-lipped; upper lip notched; the lower much larger, 3-lobed. Stamens included. Style slender; stigma 2-lobed. Fruit dry, in the bottom of the calyx, oblong, 1-celled and 1-seeded. Seed orthotropous. Cotyledons convolute round their axis.

1. PHRÝMA L. LOPSEED

A single species, with characters of the family. (Derivation of the name unknown.)

1. **P. Leptostàchya** L. Plant 3–9 dm. high; leaves 0.5–1.5 dm. long, thin; calyx strongly ribbed and closed in fruit, the long slender teeth hooked at the tip. — Moist and open woods, N. B. and Que. to Man., and southw. July, Aug. (E. Asia.)

PLANTAGINÀCEAE (PLANTAIN FAMILY)

Chiefly stemless herbs, with regular 4-merous spiked flowers, the stamens inserted on the tube of the dry and membranaceous veinless gamopetalous corolla, alternate with its lobes. — Chiefly represented by the two following genera.

1. **Littorella.** Scape 1–2-flowered. Ovary 1-celled, 1-seeded. Aquatic.
2. **Plantago.** Scape several–many-flowered. Ovary 2-celled, 2–∞-seeded. Terrestrial.

1. LITTORÉLLA Bergius.

Flowers monoecious. The staminate solitary, on a mostly simple naked scape; calyx 4-parted, longer than the cylindraceous 4-cleft corolla; anthers exserted, on very long capillary filaments. Pistillate flowers usually 2, sessile at the base of the scape; calyx of 3 or 4 unequal sepals; corolla urn-shaped, with a 3–4-toothed orifice. Ovary with a single cell and ovule, tipped with a long laterally stigmatic style, maturing as an achene. (Name from *litus* or *littus*, shore, from the place of growth.)

1. **L. uniflòra** (L.) Asch. Stoloniferous but otherwise stemless; leaves terete, linear-subulate, 2–7 cm. long. (*L. lacustris* L.) — In water or on gravelly shores, Nfd. to Me., Vt., Ont., and Minn.; very rare. (Eu.)

2. PLANTÀGO [Tourn.] L. Plantain. Ribwort

Calyx of 4 imbricated persistent sepals, mostly with dry membranaceous margins. Corolla salver-form or rotate, withering on the pod, the border 4-parted. Stamens 4, or rarely 2, in all or some flowers with long and weak exserted filaments, and fugacious 2-celled anthers. Ovary 2(or in no. 6 falsely 3–4)-celled, with 1–several ovules in each cell. Style and long hairy stigma single, filiform. Capsule 2-celled, 2–several-seeded, opening transversely, so that the top falls off like a lid and the loose partition (which bears the peltate seeds) falls away. Embryo straight, in fleshy albumen. — Leaves ribbed. Flowers whitish, small, in a bracted spike or head, raised on a naked scape. (The Latin name.)

a. Corolla not closed over the fruit *b.*
  b. Seeds plump, not hollowed on the face *c.*
    c. Leaves with more or less dilated strongly ribbed blade.
      Ribs of the broad leaves rising from the midrib . . . . . 1. *P. cordata.*
      Ribs of the leaf free to the contracted base.
        Pod circumscissile near the middle . . . . . 2. *P. major.*
        Pod circumscissile much below the middle.
          Sepals sharply carinate on the back.
            Spike densely flowered; capsule 4–9-seeded . . . . 3. *P. Rugelii.*
            Spike remotely flowered; capsule 2-seeded . . . . 4. *P. sparsiflora.*
          Sepals rounded, not sharply carinate on the back . . . 5. *P. eriopoda.*
    c. Leaves linear to subterete, fleshy, obscurely ribbed . . . . 6. *P. decipiens.*
  b. Seeds flattened, or hollowed on the face, or boat-shaped *d.*
    d. Leaves lanceolate to ovate, strongly ribbed.
      Leaves lanceolate to lance-oblong . . . . . 7. *P. lanceolata.*
      Leaves ovate to ovate-oblong . . . . . 8. *P. media.*
    d. Leaves linear to setaceous.
      White, silky-lanate; bracts not exceeding the calyx . . . 9. *P. Purshii.*
      Green, loosely pubescent; lower bracts much exceeding the calyx 10. *P. aristata.*
a. Corolla (of fertile flowers) closed over the fruit.
  Leaves spatulate-lanceolate to obovate; stamens 4.
    Fruiting calyx 1.5–2.5 mm. long; seed 0.8–1.5 mm. long . . . 11. *P. virginica.*
    Fruiting calyx 3–4 mm. long; seed 2.5–3 mm. long . . . . 12. *P. rhodosperma.*
  Leaves linear to filiform; stamens 2.
    Capsule 4-seeded . . . . . 13. *P. elongata.*
    Capsule 10–28-seeded . . . . . 14. *P. heterophylla.*

§ 1. *Stamens* 4; *flowers all perfect; corolla not closed over the fruit.*

* *Flowers proterogynous, the style first projecting from the unopened corolla, the anthers long-exserted after the corolla has opened; seeds not hollowed on the face (except in nos. 7 and 8).*

1. **P. cordàta** Lam. Tall, glabrous; leaves fleshy, heart-shaped or round-ovate, 1–2.5 dm. long, long-petioled, *the ribs arising from the midrib;* spike at length loosely flowered; bracts round-ovate, fleshy; capsule 2–4-seeded. — Along streams, in wooded swamps, etc., N. Y. and Ont. to Minn., and southw.

2. **P. màjor** L. (Common P.) Smooth or rather hairy, sometimes roughish; *leaves thick and leathery*, 0.5–3 dm. long, *the blade from broad-elliptic to cordate-ovate*, undulate or more or less toothed, the broad petiole channeled; *scapes* 1.5–9 dm. high, *commonly curved-ascending;* spike dense, obtuse, becoming 1–4 dm. long; sepals round-ovate or obovate; *capsule ovoid, circumscissile near the middle*, 8–18-seeded; *seeds angled, reticulated.* — Waysides and near dwellings, exceedingly common. Fig. 902. — Sometimes with leafy-bracted scapes or with paniculate-branched inflorescences. (Cosmopolitan.) Var. intermèdia (Gilibert) Dcne. *Leaves lance-ovate to narrowly elliptic*, coarsely sinuate-dentate, sometimes densely pubescent, *closely rosulate.* (*P. halophila* Bicknell.) — Salt marshes and coastal rocks, Me. to N. J. (Eurasia.)

902. P. major. Fruit × 3⅓.

Var. asiàtica (L.) Dcne. *Leaves upright*, the *thin smooth* blades tapering to slender petioles; *scapes erect.* — River-banks, etc., e. Que. to B. C., s. to n. N. E., L. Superior, N. Dak., Col., etc. (Asia.)

3. **P. Rugèlii** Dcne. Leaves as in no. 2, but paler and thinner, the rather slender petioles crimson at base; *spikes long and thin, attenuate at the apex;* sepals oblong, acutely carinate; *capsules cylindraceous, circumscissile much below the middle*, 4–9-*seeded; seeds oval, not reticulated.* — N. B. to Ont. and Minn., s. to Ga. and Tex. Fig. 903.

903. P. Rugelii. Fruit × 3⅓.

4. **P. sparsiflòra** Michx. *Leaves oblong-lanceolate*, often very long (3–4 dm.), villous to glabrous; scape elongate, terminated by a *long loosely flowered spike;* sepals oval, rigid; *capsules* ellipsoid, about twice as long as the calyx, circumscissile toward the base, 2-*seeded.* — Pine barrens and damp sands, S. C. to Fla.; reported from s. Ill.

5. **P. eriópoda** Torr. *Usually with a mass of yellowish wool at the base; leaves thickish, oblanceolate to obovate*, with short stout petioles; spike dense or loose; *sepals and bract more or less scarious but not carinate; capsule ovoid, never over* 4-*seeded.* — Salt marshes, e. Que. to N. S.; saline soil, Red River valley, Minn., to n. Cal. and the Arctic region.

6. **P. decípiens** Barneoud. (Seaside P.) *Leaves linear to nearly filiform*, 1–10 mm. broad, entire or remotely serrate, *fleshy, indistinctly ribbed;* scapes slightly pubescent below, densely so at tip, 2–30 cm. high, from erect to strongly arcuate; *spikes slender-cylindric*, 0.5–12 cm. long, dense or loose; scales and sepals from drab to purplish-brown; corolla-tube often pubescent; seeds 2–4. (*P. maritima* Man. ed. 6, not L.) — Salt marshes and maritime rocks, Greenl. and Lab. to N. J. — Very variable in size and habit, the most dwarf extreme sometimes separated as *P. borealis* Lange.

7. **P. lanceolàta**, L. (Rib Grass, Ripple Grass, English P.) Mostly hairy; scape grooved-angled, at length much longer than the *lanceolate or lance-oblong leaves*, slender, 2–7 dm. high; spike dense, at first capitate, in age cylindrical; bracts and sepals scarious, brownish; *seeds* 2, *hollowed on the face.* — Very common in grass land. (Nat. from Eu.)

8. **P. mèdia** L. (Hoary P.) Resembling the preceding, but with *shorter ovate or broad-oblong finely canescent leaves;* the cylindric spike 2.5–8 cm. long; *seeds slightly concave or flat on the face;* flowers fragrant. — Sparingly in fields, etc., Me. to Ont. and N. Y. (Adv. from Eu.)

* * *Flowers of* 2 *sorts (as respects length of anthers and filaments) on different plants, mostly cleistogamous; corolla-lobes broad, rounded, persistently spreading; seeds* 2, *boat-shaped; inflorescence and narrow leaves silky-pubescent or woolly; annual.*

9. **P. Púrshii** R. & S. *White with silky wool;* leaves 1–3-nerved, varying from oblong-linear to filiform; *spike slender-cylindric*, very dense, 0.5–15 cm. long, woolly; *bracts not exceeding the calyx;* sepals very obtuse, scarious, with a thick center. (*P. patagonica* Jacq., var. *gnaphalioides* Gray.) — Prairies and dry plains, Minn. to Ind., Ky., Tex., and westw. to the Pacific; adventive eastw. to N. E.

10. **P. aristàta** Michx. Similar; *loosely hairy and green*, or becoming glabrous; the narrowly linear bracts 2–6 times as long as the flowers. (*P. patagonica*, var. Gray.) — Dry plains and prairies, Ill. to La., and westw.; naturalized in sterile soil castw. to the Atlantic.

§ 2. *Flowers subdioecious or polygamo-cleistogamous; the corolla in the fertile (or mainly fertile) plant closed over the maturing capsule and forming a kind of beak, and anthers not exserted; sterile flowers with spreading corolla and long-exserted filaments; seeds mostly flat; small annuals or biennials.*

11. **P. virgínica** L. Hairy or hoary-pubescent, 0.5–4 dm. high; leaves oblong, varying to obovate and spatulate-lanceolate, 3–5-nerved, slightly or coarsely and sparingly toothed; spikes mostly dense, 1–9 cm. long; *fruiting calyx* 1.5–2.5 *mm. long; mature corolla slender-cylindric; seeds* usually 2, brown or yellowish, 0.8–1.5 *mm. long.* — Sandy grounds, chiefly near the coast, R. I. to Fla. and Tex.; inland in Miss. basin to s. Mich., Ill., Mo., and Kan.; also on the Pacific slope. (Mex.)

12. **P.** RHODOSPÉRMA Dcne. Similar to the preceding; *fruiting calyx* 3–4 *mm. long; mature corolla slender-conical; seeds* reddish, 2.5–3 *mm. long.* — Dry prairies and open woods, La. to Ariz. and n. Mex.; adventive in Mo.

13. **P. elongàta** Pursh. Minutely pubescent, 3–16 cm. high; *leaves linear to filiform*, entire; *capsule short-ovoid, 4-seeded*, little exceeding the calyx and bract. (*P. pusilla* Nutt.) — Sandy soil, s. Mass. to Ga.; and from Ill. to Assina., La., and westw. Apr.–Aug.

14. **P. heterophýlla** Nutt. Leaves rather fleshy, acute, entire, or some of them 2–4-lobed or toothed below; *capsule slender-conoidal*, 10–28-*seeded*, nearly twice the length of the calyx and bract. — Low sandy ground, N. J. to Fla., Tex., and Ark. Apr.–June.

RUBIÀCEAE (MADDER FAMILY)

Woody or herbaceous plants, with opposite entire leaves connected by interposed stipules, or in whorls without apparent stipules, the calyx adherent to the 2–4-celled ovary, the stamens as many as the lobes of the regular corolla (4–5), *and inserted on its tube.* Flowers perfect, but often dimorphous (as in *Mitchella* and *Houstonia*). Fruit various. Seeds anatropous or amphitropous. Embryo commonly rather large, in copious hard albumen. — A very large family, the greater part, and all its most important plants (such as the Coffee and Peruvian-bark trees), tropical.

N. B. — The figures in this family are on a scale of $\frac{2}{3}$.

SUBFAMILY I. COFFEOÍDEAE. Ovules solitary in the cells

* Herbs.

+ Leaves in whorls.

1. **Sherardia.** Corolla funnel-form. Calyx-lobes lanceolate. Flowers subsessile, involucrate.
2. **Asperula.** Corolla tubular-campanulate below. Calyx-lobes obsolete. Fruit as in *Galium*.
3. **Galium.** Corolla wheel-shaped, 4 (or rarely 3)-parted. Calyx-teeth obsolete. Fruit twin, separating into 2 indehiscent 1-seeded carpels.

+ + Leaves opposite.

++ Flowers axillary, separate; fruit dry when ripe.

4. **Spermacoce.** Corolla funnel-form or salver-form; lobes 4. Fruit separating when ripe into 2 carpels, one or both of them opening.
5. **Diodia.** Fruit separating into 2 or 3 closed and indehiscent carpels; otherwise as no. 4.

++ ++ Flowers twin; their ovaries united into 1; fruit a 2-eyed berry.

6. **Mitchella.** Corolla funnel-form; its lobes 4. A creeping herb.

* * Shrubs or trees.

7. **Cephalanthus.** Corolla tubular; lobes 4. Fruit inversely pyramidal, 2–4-seeded.

SUBFAMILY II. CINCHONOÍDEAE. Ovules numerous in each cell; leaves opposite.

8. **Houstonia**. Corolla salver-form or funnel-form, 4-lobed. Seeds rather few, thimble-shaped or saucer-shaped. Low herbs.

9. **Oldenlandia**. Corolla wheel-shaped in our species, 4-lobed. Seeds very numerous and minute, angular. Low herbs.

1. SHERÁRDIA [Dill.] L. FIELD MADDER

Calyx-lobes lanceolate, persistent. Corolla funnel-form, the limb 4–5-lobed. Style filiform, 2-cleft; stigmas capitate. Fruit dry, twin, of 2 indehiscent 1-seeded carpels. — A slender procumbent herb, with square stems, lanceolate pungent leaves in whorls of 4–6, and small blue or pinkish flowers surrounded by a gamophyllous involucre. (Named for *Dr. William Sherard*, patron of Dillenius.)

1. S. ARVÉNSIS L. The only species. — Waste places and fields, N. S. to Ont., O., and N. J., local. (Nat. from Eu.)

2. ASPÉRULA L.

Similar to *Galium*, but with tubular or tubular-campanulate corolla. — An Old World genus. (Name from *asper*, rough, in reference to some scabrous species.)

1. A. GALIOÌDES Bieb. Smooth and glaucous, 3–8 dm. high; leaves 5–10 in a whorl, linear, subulate-tipped; flowers white, short-pediceled in cymules forming a handsome panicle. — Fields, local, Ct. to Mich. (Adv. from Eu.)

3. GÀLIUM L. BEDSTRAW. CLEAVERS

Calyx-teeth obsolete. Corolla wheel-shaped, valvate in the bud. Stamens 4, rarely 3, short. Styles 2. Fruit dry or fleshy, globular, twin, separating when ripe into the 2 seed-like indehiscent 1-seeded carpels. — Slender herbs, with small cymose flowers (produced in summer), square stems, and whorled leaves, the roots often containing a red coloring matter. (Name from γάλα, *milk*, which some species are used to curdle.)

a. Fruit dry *b*.
- *b*. Annuals.
  - Fruit bristly.
    - Flowers sessile or subsessile; leaves 4–7 mm. long . . . . 1. *G. virgatum*.
    - Flowers on long ascending axillary peduncles . . . . . 2. *G. Aparine*.
  - Fruit smooth or merely granulate-roughened.
    - Flowers 1–few on axillary peduncles; fruit 3–4 mm. thick . 3. *G. tricorne*.
    - Flowers tiny, in terminal small cymes; fruit barely 1 mm. thick 4. *G. parisiense*.
- *b*. Perennials *c*.
  - *c*. Flowers yellow.
    - Panicle rather dense, its lower branches much exceeding the internodes . . . . . 5. *G. verum*.
    - Panicle loose, slender, interrupted, its lower branches shorter than the internodes . . . . . 6. *G. Wirtgenii*.
  - *c*. Flowers white, greenish-white, or purplish *d*.
    - *d*. Erect plants, neither the stems nor leaves retrorsely scabrous *e*.
      - *e*. Leaves mostly in 4's *f*.
        - *f*. Peduncles loosely 3–several-flowered; flowers dull purple to greenish-white *g*.
          - *g*. Fruit uncinate-hispid.
            - Mature flowers and fruits on distinct pedicels.
              - Leaves firm and dull, the whorls uniform . . . 7. *G. pilosum*.
              - Leaves filmy and lucid; the upper whorl largest . 8. *G. kamtschaticum*.
            - Flowers and fruits mostly sessile or subsessile along the loosely divergent branches of the peduncles.
              - Leaves oval or oblong, obtuse; flowers commonly pubescent . . . . . 9. *G. circaezans*.
              - Leaves lance-acuminate; flowers glabrous . . 10. *G. lanceolatum*.
          - *g*. Fruit smooth.
            - Leaves ovate-lanceolate, 3-nerved . . . . . 11. *G. latifolium*.
            - Leaves linear or lanceolate, 1-nerved . . . 12. *G. arkansanum*.

f. Flowers bright white, numerous, in a compact panicle; leaves linear-lanceolate . . . . . 13. *G. boreale.*
e. Leaves mostly in 6's or 8's; flowers white, numerous, in leafy panicles.
Leaves firm, linear or oblanceolate, rarely 2 cm. long.
Flowering branches and pedicels strongly divaricate . 14. *G. Mollugo.*
Flowering branches and pedicels mostly ascending . . 15. *G. erectum.*
Leaves thin, lanceolate, mostly 3–5 cm. long . . . 16. *G. sylvaticum.*
d. Matted, reclining, or ascending plants, usually with more or less retrorsely scabrous stems or leaves *h.*
h. Fruit smooth or merely granulate-roughened *i.*
i. Leaves obtuse.
Flowers several in a small dichotomous cyme; the pedicels horizontally spreading . . . . . 17. *G. palustre.*
Flowers solitary or in mostly simple cymes of 2–5 flowers.
Corollas greenish-white, small (1.5 mm. or less broad), commonly with 3 obtuse lobes; stems retrorse-scabrous.
Flowers mostly solitary, on capillary arcuate scabrous pedicels . . . . . 18. *G. trifidum.*
Flowers in 2's and 3's; pedicels straight, smooth . 19. *G. Claytoni.*
Corollas white, 2–2.5 mm. broad, commonly with 4 acute lobes; stems mostly smooth.
Leaves chiefly ascending; fruit 2.5–3.5 mm. in diameter . . . . . 20. *G. tinctorium.*
Leaves chiefly reflexed; fruit 1–1.5 mm. in diameter 21. *G. labradoricum*
i. Leaves acute or cuspidate.
Leaves linear, slightly upward-scabrous on the margins . 22. *G. concinnum.*
Leaves lanceolate, retrorse-scabrous . . . . . 23. *G. asprellum.*
h. Fruit bristly . . . . . 24. *G. triflorum.*
a. Fruit a berry; leaves in 4's, 1-nerved . . . . . 25. *G. hispidulum.*

1. G. virgàtum Nutt. Slender and *erect;* stem 1–3 dm. high, simple or branching from the base; *leaves mostly in* 4's, thick, oblong or linear, 4–7 mm. long; *flowers solitary*, sessile, *subtended by a pair of small bracteal leaves;* fruit uncinate-hispid. — Dry soil, Mo. to Tenn. and Tex.

2. G. Aparìne L. (Cleavers, Goose Grass.) *Stem weak and reclining, bristle-prickly backward*, hairy at the joints; *leaves about* 8 *in a whorl*, lanceolate, tapering to the base, short-pointed, rough on the margins and midrib, 2.5–7 cm. long; *peduncles* 1–3-*flowered;* flowers white; fruit bristly, 3–4 mm. in diameter. — Seashores, Que. to Fla., and in rich or shaded ground inland; perhaps sometimes introd. (Eurasia.)

Var. Vaillántii (DC.) Koch. Smaller; the leaves less than 2.5 cm. long; *hispidulous fruit smaller*, 1.5–2 mm. in diameter. (*G. spurium* L.) — Ont., westw. and southwestw.

3. G. tricórne Stokes. Resembling no. 2, rather stout, with simple branches; leaves 6 or 8, oblanceolate, cuspidate-mucronate, the margins and stem retrorsely prickly-hispid; *flowers* mostly *in clusters of* 3, dull white; *fruits* rather large, *tuberculate-granulate*, not hairy, pendulous. — Ballast, local. (Adv. from Eu.)

4. G. parisiénse L. Slender, diffuse, 1–3 dm. high, glabrous; leaves 5–7, oblanceolate to nearly linear, 5–10 mm. long, their margins and the angles of the stem spinulose-scabrous; *flowers* rather few, *cymulose on leafy branches*, greenish-white, very small; *fruit glabrous*, more or less tuberculate. (*G. anglicum* Huds.) — Roadsides, Va. (Nat. from Eu.)

5. G. vèrum L. (Yellow B.) Stems smooth, erect; *leaves* 8 or sometimes 6 in the whorls, *linear, roughish, soon deflexed; flowers yellow*, very numerous, densely paniculate, *the lower branches of the panicle at anthesis much exceeding the subtending leaves;* fruit usually smooth. — Dry fields, Me. to N. J., Pa., and Ont., local. (Nat. from Eu.)

6. G. Wirtgènii F. Schultz. Similar to the preceding; flowers yellow, slightly larger, 3 mm. in diameter; the panicle long and interrupted, *the lower branches at anthesis shorter than or scarcely surpassing the subtending leaves.* — Established in meadows, Norfolk, Ct. (*Miss Seymour*). (Adv. from Eu.)

7. G. pilòsum Ait. *Hairy; leaves oval*, dotted, hairy, 2–2.5 cm. long, the lateral nerves obscure; *peduncles* 2–3-*forked, the flowers all pediceled.* — Dry copses, N. H. to Ont., Mich., Ill., Kan., and southw.

Var. puncticulòsum (Michx.) T. & G. Almost glabrous; leaves varying to elliptical-oblong, hispidulous-ciliate. — N. J. to Va. and Tex.

8. **G. kamtscháticum** Steller. Stems weak, mainly glabrous, 1–3 dm. long, *leaves orbicular to oblong-ovate, thin*, 1–3 cm. long, slightly pilose; flowers slender-pediceled; *corolla glabrous, yellowish-white*, not turning dark, *its lobes merely acute.* — Mts. of Cape Breton I., Que., N. E., and N. Y. (E. Asia.)

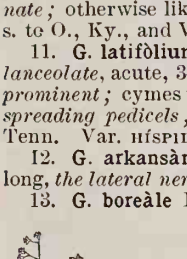
9. **G. circaèzans** Michx. (WILD LIQUORICE.) More or less pubescent, 3 dm. high; *leaves oval*, varying to ovate-oblong, *mostly obtuse*, ciliate, 1.5–4.5 cm. long; *peduncles usually once forked, the branches elongated* and widely diverging in fruit, *bearing several remote flowers on very short lateral pedicels*, reflexed in fruit; lobes of the *greenish corolla hairy outside, acute or acuminate.* — Rich woods, s. Me. and w. Que. to Minn., s. to Fla. and Tex. Var. GLÀBRUM Britton. Smoothish, leaves sparingly pubescent on the upper surface or merely ciliate; corolla glabrous. (Var. *glabellum* Britton.) — Rensselaer, Albany, and Washington Cos., N. Y. (according to Peck).

10. **G. lanceolàtum** Torr. (WILD LIQUORICE.) Nearly glabrous; *leaves* (except the lowest) *lanceolate or ovate-lanceolate, tapering to the apex*, 3–7.5 cm. long; *corolla glabrous, yellowish, turning dull purple, its lobes more acuminate;* otherwise like the preceding. — Dry woods, s. Me. and w. Que. to Minn., s. to O., Ky., and Va.

11. **G. latifòlium** Michx. Smooth, 3–6 dm. high; *leaves lanceolate or ovate-lanceolate*, acute, 3–6 cm. long, the midrib and margins rough, *the lateral nerves prominent;* cymes panicled, loosely many-flowered, the purple *flowers on slender spreading pedicels;* fruit rather fleshy. — Dry woods, mts. of Pa. to N. C. and Tenn. Var. HÍSPIDUM Small. Stems and leaves hispid. — Iron Mts., Va.

12. **G. arkansànum** Gray. Similar; leaves lanceolate to linear, 2–3.5 cm. long, *the lateral nerves obscure or none.* — Rocky woods, s. Mo., Ark., and Okla.

13. **G. boreàle** L. (NORTHERN B.) Smooth, 3–9 dm. high; *leaves in 4's*, linear-lanceolate; *flowers bright white, in compact panicles;* fruit minutely bristly, sometimes smooth. — Rocky banks, shores, etc., Que. to Alaska, s. to N. J., Pa., Mich., Mo., S. Dak., Col., etc.; rare eastw.


904. G. Mollugo.

14. **G. MOLLÙGO** L. Perennial, smooth throughout or pubescent below; stems erect or diffuse, usually numerous, 3–9 dm. long; *leaves in 8's or on the branchlets in 6's*, oblanceolate to nearly linear; *flowers white, very numerous in loose* ample almost leafless *panicles; branches and pedicels mostly wide-spreading;* fruit smooth. — Roadsides and fields, Nfd. to Del. and O. (Nat. from Eu.) FIG. 904.

15. **G. ERÉCTUM** Huds. Similar; stems mostly erect; flowers fewer and slightly larger; *the branches and pedicels mostly ascending.* — Fields, etc., e. Que. to Vt. and Ct. (Nat. from Eu.) FIG. 905.

905. G. erectum.

16. **G. SYLVÁTICUM** L. (SCOTCH MIST, BABY'S BREATH.) Stems very many, tall, suberect, shining, somewhat geniculate at base; lower *leaves* 8, upper 4 or 6 in a whorl, *acuminate, smooth*, entire, glaucous beneath; *pedicels capillary, very ascending, in loose terminal panicles;* fruit smooth. — Fields and thickets, N. E., escaped from cultivation. (Introd. from Eu.)

906. G. palustre.

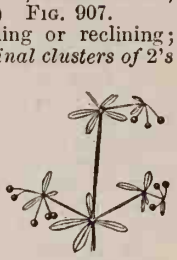
17. **G. palústre** L. Slender, 2–5 dm. high, slightly branched, branches solitary or opposite; leaves linear-elliptic or spatulate, thin, dull, barely 1 cm. long; *flowers numerous in terminal cymes; pedicels becoming strongly divaricate; corolla 4-parted, white or rose-tinged*, 2.5–3.3 *mm. broad; fruit* glabrous, *lunate in cross-section.* — Wet meadows and banks, Nfd. and Que. to Ct., N. Y., and Mich. June, July. (Eu.) FIG. 906.

18. **G. trífidum** L. Slender and weak, very freely branched, forming dense mats; primary leaves oftenest in 4's, linear-spatulate, 0.5–1.3 cm. long; *flowers* solitary, or when terminal in 3's, *on capillary scabrous arcuate pedicels; corolla* whitish, 0.5 *mm. long; fruit annular in cross-section.* (*G. trifidum,*

907. G. trifidum.

var. *pusillum* Gray.) — Bogs, mossy woods, and wet shores, Nfd. and Lab. to B. C., s. to n. and w. N. E., centr. N. Y., O., Mich., Neb., etc. July–Sept. (Eurasia.) Fig. 907.

19. G. **Claytòni** Michx. Stouter, ascending or reclining; primary leaves in 4's and 6's; *flowers in terminal clusters of* 2's *and* 3's; *pedicels stout, straight, and glabrous.* (*G. trifidum* Man ed. 6, in part.) — Swamps and damp places, e. Que. to N. C., Neb., and Tex. July–Sept. Fig. 908.


908. G. Claytoni.

20. G. **tinctòrium** L. *Erect;* stem smooth, *stiffish*, 1.5–8 dm. high, freely branched from near the base; *leaves* mostly in 4's, linear or lanceolate, 1.5–2.5 *cm. long*, cuneate at base, dull green, slightly scabrous on margin and midrib; *flowers* 2 *or* 3 *in terminal clusters, the pedicels scarcely divaricate even in fruit; fruit* 2.5–3.5 *mm. in diameter.* (*G. trifidum*, var. *latifolium* Torr.) — Damp shady places, w. Que. to Neb., s. to N. C. and Ariz. May–July. Fig. 909.

909. G. tinctorium.

Var. **filifòlium** Wiegand. More slender; leaves nearly filiform; inflorescence more open; corolla broader. — Va., and southw. near the coast.

21. G. **labradòricum** Wiegand. *Low;* stem smooth, slender, 0.5–3 dm. high, *from capillary rootstocks; leaves small*, 0.5–1.5 *cm. long, soon reflexed*, scabrous beneath on the margin and nerve; flowers as in the preceding but smaller; *fruit much smaller.* (*G. tinctorium*, var. Wiegand.) — In moss, mostly beneath Larch or Arbor Vitae, Nfd. to Wisc., N. Y., and n. Ct. Fig. 910.

910. G. labradoricum

22. G. **concínnum** T. & G. Stems low and slender, 1.5–3 dm. high, with minutely roughened angles; leaves all in 6's, linear, slightly pointed, veinless, the margins upwardly roughened; *peduncles* 2–3 *times forked, diffusely panicled;* pedicels short. — Dry hills, N. J. and Pa. to Va., w. to Minn., Ia., and Ark.

23. G. **asprèllum** Michx. (Rough B.) *Stem* 0.5–1.8 m. high, much branched, *rough backwards with hooked prickles*, leaning on bushes; leaves in whorls of 6, or 4–5 on the branchlets, oval-lanceolate, with almost prickly margins and midrib; *peduncles short*, 2–3 *times forked.* — Alluvial ground, Nfd. to N. C., w. to Ont., Minn., Neb., and Mo.

24. G. **triflòrum** Michx. (Sweet-scented B.) Stem 3–10 dm. long, bristly-roughened backward on the angles; *leaves* elliptical-lanceolate, *bristle-pointed*, with slightly roughened margins, 2–8.5 cm. long; *peduncles 3-flowered*, the flowers all pediceled, greenish; *fruit beset with hooked bristles.* — Rich woodlands, Nfd. to B. C., and southw. — Sweet-scented in drying. (Greenl., Eu.)

25. G. **hispídulum** Michx. Hirsute-pubescent, scabrous, or sometimes nearly smooth, 3–6 dm. high, diffusely branched; leaves oblong or oval, mucronate, 0.5–2 cm. long; pedicels solitary or commonly 2 or 3 from the small involucral whorl, all naked, or one of them bracteolate; flowers white; *berry purple, glabrate.* — Dry or sandy soil, s. N. J. to Fla., along the coast.

4. SPERMACÒCE [Dill.] L. Buttonweed

Calyx-tube short; the limb parted into 4 teeth. Corolla funnel-form or salver-form, valvate in the bud. Stigma or style 2-cleft. Fruit small and dry, 2-celled, splitting when ripe into 2 carpels, one of them usually carrying with it the partition, and therefore closed, the other open on the inner face. — Small herbs, the bases of the leaves or petioles connected by a bristle-bearing stipular membrane. Flowers small, whitish, crowded into sessile axillary whorled clus-

911. S. glabra.

ters or heads. (Name compounded of σπέρμα, *seed*, and ακωκή, *a point*, probably from the pointed calyx-teeth on the fruit.)

1. **S. glàbra** Michx. Glabrous perennial; stems spreading, 2–5 dm. long; leaves oblong-lanceolate; heads many-flowered; corolla little exceeding the calyx, bearded in the throat, bearing the anthers at its base; filaments and style hardly any. — River-banks, s. O. to Ill., Ark., Tex., and Fla. Aug. Fig 911.

5. DIÒDIA [Gronov.] L. Buttonweed

Calyx-teeth 2–5, often unequal. Fruit 2(rarely 3)-celled, the crustaceous carpels into which it splits all closed and indehiscent. Flowers 1–3 in each axil. — Resembling *Spermacoce*. Flowering all summer. (Name from δίοδος, *a thoroughfare;* the species often growing by the wayside.)

1. **D. virginiàna** L. Smooth or hairy perennial; stems spreading, 3–6 dm. long; leaves lanceolate or oblong-lanceolate, sessile; corolla white, 1 cm. long, the *slender tube abruptly expanded into the large limb; style 2-parted; fruit ellipsoid, strongly furrowed*, crowned mostly with 2 slender calyx-teeth. — Low grounds along streams, s. N. J. to Fla., w. to Mo., Ark., and Tex. Fig. 912.

912. D. virginiana.

2. **D. tères** Walt. Hairy or minutely pubescent annual; stem spreading, 1–8 dm. long, nearly terete; leaves linear-lanceolate, closely sessile, rigid; *corolla funnel-form*, 4–6 mm. long, whitish, with short lobes, not exceeding the long bristles of the stipules; *style undivided; fruit* obovoid-turbinate, *not furrowed*, crowned with 4 short calyx-teeth. — Sandy shores and barrens, Ct. to Fla.; and from O. to Kan., and southw. (Mex., W. I.)

6. MITCHÉLLA L. Partridge Berry

Flowers in pairs, with their ovaries united. Calyx 4-toothed. Corolla-lobes spreading, densely bearded inside, valvate in the bud. Style 1; stigmas 4, linear. Fruit a berry-like double drupe, crowned with the calyx-teeth of the two flowers, with 4 small seed-like bony nutlets to each flower. — A smooth and trailing small evergreen herb, with round-ovate and shining petioled leaves, minute stipules, white fragrant flowers often tinged with purple, and scarlet (rarely whitish) edible (but nearly tasteless) berries, which remain over winter. Flowers occasionally 3–6-merous, always dimorphous; all those of some individuals having exserted stamens and included stigmas; of others, included stamens and exserted style. (This very pretty plant commemorates *Dr. John Mitchell*, an early correspondent of Linnaeus, and an excellent botanist, who resided in Virginia.)

1. **M. rèpens** L. — Dry woods, creeping about the bases of trees, especially *Coniferae*, throughout our range, and southw. June, July. — Leaves often variegated with whitish lines. Rarely the two flowers completely confluent into one, with a 10-lobed corolla.

7. CEPHALÁNTHUS L. Buttonbush

Calyx-tube inversely pyramidal, the limb 4-toothed. Corolla-teeth imbricated in the bud. Style thread-form, much protruded. Stigma capitate. Fruit small, at length splitting from the base upward into 2–4 closed 1-seeded portions. — Shrubs or small trees, with the white flowers densely aggregated in spherical peduncled heads. (Name composed of κεφαλή, *a head*, and ἄνθος, *a flower*.)

1. **C. occidentàlis** L. Smooth; leaves petioled, essentially glabrous, ovate or lanceolate-oblong, pointed, opposite or whorled in threes, with short intervening stipules. — Swamps and along streams, s. w. N. B. to w. Ont., and southw. July, Aug. — Usually a shrub with us, rarely arborescent and 5 or 6 m. high. (Mex., W. I.)

Var. **pubéscens** Raf. Branchlets and at least the lower surfaces of the leaves soft-pubescent. — Ill. to Ga., La., and Tex.

8. HOUSTÒNIA L.

Calyx 4-lobed, persistent; the lobes in fruit distant. Corolla usually much longer than the calyx-lobes, the lobes valvate in the bud. Anthers linear or oblong. Style 1; stigmas 2. Ovary 2-celled. Pod top-shaped, globular, or didymous, thin, its summit or upper half free from and projecting beyond the tube of the calyx, loculicidal across the top. Seeds 4–20 in each cell, pitted. — Small herbs, with short entire stipules connecting the petioles or narrowed bases of the leaves, and cymose or solitary and peduncled flowers; these dimorphous, in some individuals with exserted anthers and short included style; in others the anthers included and the style long, the stigmas therefore protruding. (Named for *Dr. William Houston*, an English botanist, who collected in tropical America.)

* *Small and delicate, vernal-flowering; peduncles 1-flowered; corolla salverform; upper half of the broad and somewhat 2-lobed pod free; seeds globular, with a very deep round cavity occupying the inner face.*

+ *Perennial by delicate filiform creeping rootstocks or creeping stems; peduncles filiform, 2–5 cm. long.*

1. **H. caerùlea** L. (Bluets, Innocence.) Glabrous; *stems erect*, slender, sparingly branched from the base, 0.5–2 dm. high; *leaves oblong-spatulate*, 6–9 mm. long; peduncle filiform, erect; *corolla light blue*, pale lilac or nearly white, with a yellowish eye, the straight slender long-exserted tube much longer than its lobes or than those of the calyx. — Moist and grassy places, N. S. to Ga., w. to Ont., Wisc., and Ala.; producing from early spring to midsummer its delicate little flowers.

Var. **Faxonòrum** Pease & Moore. Corolla white, with a prominent yellow eye, the tube shorter, gradually expanding to the limb. — Alpine regions, White Mts., N. H.

2. **H. serpyllifòlia** Michx. Like the preceding species, but the filiform *stems prostrate*, extensively creeping and rooting; *leaves orbicular to ovate*, 4–9 mm. long; *corolla* rather larger, and *deep violet-blue*. — Along streamlets and on mts., Pa. to Tenn. and S. C.

913. H. patens.

+ + *Winter-annuals, branching chiefly from the base; root simple; peduncles much shorter.*

3. **H. pàtens** Ell. Stems 2 cm. to at length 1 dm. high, with ascending branches and erect peduncles; leaves spatulate to ovate; corolla much smaller than that of no. 1, violet-blue or purplish without yellowish eye, *the tube longer than its lobes, twice the length of the calyx-lobes.* (*H. minor* Britton.) — Dry or sandy soil, Va. to Ill. and Mo., s. to Ga. and Tex. Fig. 913.

4. **H. mínima** Beck. More diffuse, *commonly scabrous;* stems at length much branched and spreading, 2–10 cm. high; lowest leaves ovate or spatulate, the upper oblong or nearly linear; earlier peduncles elongated and spreading in fruit, the later ones short; *tube of the purplish corolla not longer than its lobes or the ample calyx-lobes* (3 mm. long). — Dry hills, s. e. Ia. to Tex. Mar.-May.

* * *Erect, mostly perennial herbs, 1–5 dm. high, with stem-leaves sessile, and flowers in small terminal cymes or clusters; corolla funnel-form, white to purplish, often hairy inside; seeds meniscoidal, with a ridge across the hollowed inner face.*

+ *Pod free above the middle.*

++ *Pod distinctly broader than high.*

914. H. purpurea.

5. **H. purpùrea** L. Smooth or slightly pubescent, 1–5 dm. high; *leaves varying from roundish-ovate to lanceolate*, 3–5-ribbed; calyx-lobes longer than the *half-free globular pod.* — Woodlands, Md. to s. Ia., and southw. May–Sept. Fig. 914. Var. PUBÉSCENS Britton. Stems and leaves densely pubescent. — Range of the typical form.

6. **H. tenuifòlia** Nutt. Slender, lax, diffuse, 1.5–3 dm. high, with loose inflorescence, and *almost filiform branches and peduncles;* cauline *leaves* all *linear*, hardly over 2 mm. wide. (*H. purpurea*, var. Gray.) — Dry rocks, e. O. to Va., N. C., and Tenn.

++ ++ *Pod as high as broad.*

= *Leaves smooth.*

7. **H. longifòlia** Gaertn. Similar to no. 5; stem 1–2.5 dm. high, mostly glabrous; leaves oblong-lanceolate to linear, 1.5–2.5 cm. long; radical oval or oblong, less rosulate, not ciliate; *calyx-lobes subulate*, 1.5–2.5 *mm. long.* (*H. purpurea*, var. Gray.) — Rocky or gravelly ground, centr. Me. to Man., s. to Ga. and Mo. Fig. 915.

915. H. longifolia.

8. **H. lanceolàta** (Poir.) Britton. Stoutish, 1.5–4 dm. high; leaves broadly lanceolate, thickish; inflorescences very leafy; *calyx-lobes lanceolate, herbaceous*, 5–9 *mm. long*, much exceeding the globose-ovoid capsule. (*H. purpurea*, var. *calycosa* Gray.) — Dry soil, s. Me. to Ill., Okla., and Ala. Fig. 916.

916. H. lanceolata.

= = *Leaves (at least the basal) ciliate.*

9. **H. ciliolàta** Torr. Stems 1–2 dm. high; leaves 1–2 cm. long, thickish; cauline oblong-spatulate; radical oval or oblong, rosulate, hirsute-ciliate; calyx-lobes a little longer than the pod. (*H. purpurea*, var. Gray.) — Rocky banks and shores, w. N. Y. and s. Ont. to Minn., Ill., and Ky.

+ + *Pod free only at summit.*

10. **H. angustifòlia** Michx. Stems tufted, from a hard or woody root; *leaves narrowly linear*, acute, 1-ribbed, many of them fascicled; flowers crowded, short-pediceled; lobes of the corolla densely bearded inside; *pod obovoid, acute at base, only its summit free*, opening first across the top, at length through the partition. — Barrens, Ill. to Kan., s. to Tex. and Fla. (Mex.)

9. OLDENLÁNDIA [Plumier] L.

Calyx 4-lobed, persistent. Corolla short, the limb valvate in the bud. Anthers short. Style 1 or none; stigmas 2. Pod thin, 2-celled, opening loculicidally across the summit. — Low herbs, with small stipules united to the petioles. (Dedicated to the memory of *H. B. Oldenland*, a Danish physician and botanist, who died about the end of the 17th century at the Cape of Good Hope.)

917. O. uniflora

1. **O. uniflòra** L. An inconspicuous pubescent or smoothish branched and spreading annual, 0.2–4 dm. high; leaves ovate to oblong; flowers in sessile axillary clusters; corolla nearly wheel-shaped, white, much shorter than the calyx. (*O. glomerata* Michx.) — Wet places, near the coast, N. Y. to Fla. and Tex. Fig. 917.

CAPRIFOLIÀCEAE (Honeysuckle Family)

Shrubs, or rarely herbs, with opposite leaves, the calyx-tube adherent to the 2–5-celled ovary, the stamens as many as (1 fewer in *Linnaea*, doubled in *Adoxa*) *the lobes of the tubular or rotate corolla, and inserted on its tube.* Fruit a berry, drupe, or pod, 1–several-seeded. Seeds anatropous, with small embryo in fleshy albumen.

Tribe I. **LONICÈREAE.** Corolla tubular, often irregular, sometimes 2-lipped. Style slender; stigma capitate.

* Erect or climbing shrubs, with scaly winter-buds.

1. **Diervilla.** Stamens 5. Corolla funnel-form, nearly regular. Pod 2-celled, 2-valved, many-seeded, slender.
2. **Lonicera.** Stamens 5, as many as the lobes of the tubular and more or less irregular corolla. Berry several-seeded; all the 2 or 3 cells fertile.
3. **Symphoricarpos.** Stamens 4 or 5, as many as the lobes of the bell-shaped regular corolla. Berry 4-celled, but only 2-seeded; two of the cells sterile.

* * Herbs, with axillary flowers.

4. **Linnaea.** Stamens 4, one fewer than the lobes of the corolla. Fruit dry, 3-celled, but only 1-seeded. Creeping, with long-pedunculate twin flowers.
5. **Triosteum.** Stamens 5. Corolla gibbous at the base. Fruit a 3-celled drupe. Erect; flowers sessile.

Tribe II. **SAMBÙCEAE.** Corolla wheel-shaped or urn-shaped, regular, deeply 5-lobed. Stigmas 1–5, sessile or nearly so. Inflorescence terminal and cymose.

* Shrubs, with stamens as many as corolla-lobes, the flowers in broad compound cymes.

6. **Viburnum.** Fruit a 1-celled 1-seeded drupe, with a compressed stone. Leaves simple.
7. **Sambucus.** Fruit berry-like, containing 3 small seed-like nutlets. Leaves pinnate.

* * Dwarf herb, with stamens doubled and flowers in a capitate cluster.

8. **Adoxa.** Fruit a dry greenish drupe, with 3–5 cartilaginous nutlets. Cauline leaves a single pair and ternate.

1. DIERVÍLLA [Tourn.] Mill. Bush Honeysuckle

Calyx-tube tapering at the summit; the lobes slender, awl-shaped, persistent. Corolla 5-lobed. Pod slender, pointed, septicidal. — Low upright shrubs, with ovate or oblong pointed serrate leaves, and cymosely 3–several-flowered peduncles, from the upper axils or terminal. (Named in compliment to *Dr. N. Diéreville*, who carried it from Canada to Tournefort.) Several early-flowering Asiatic shrubs of this genus are frequent in cultivation under the name Weigela, and may in some instances persist or spread.

1. **D. Lonicèra** Mill. Leaves oblong-ovate, taper-pointed, petioled; peduncles mostly 3-flowered; pod long-beaked. (*D. trifida* Moench; *D. Diervilla* MacM.) — Dry woods and rocky places, Nfd. to Man., s. to N. C. and the Great L. region. June–Aug. — Flowers at first pale yellow, turning to deep yellow, scarlet, crimson, or even maroon.

2. LONICÈRA L. Honeysuckle

Calyx-teeth very short. Corolla tubular or funnel-form, often gibbous at the base, irregularly or almost regularly 5-lobed. Berry several-seeded. — Erect or climbing shrubs. Leaves entire. Flowers often showy and fragrant. (Named in honor of *Adam Lonitzer*, latinized *Lonicerus*, a German herbalist of the 16th century.) A large boreal genus most abundant in Asia and long popular in cultivation.

§ 1. XYLÓSTEON [Tourn.] Pers. *Leaves all distinct; peduncles axillary, single, 2-flowered at the summit; the two berries sometimes united into one; calyx-teeth not persistent.*

* *Upright bushy shrubs.*

+ *Bracts* (2 *or sometimes* 4) *at the base of the ovaries small, lance-oblong to linear.*

++ *Corolla-lobes subequal.*

= *Peduncles short* (3–7 *mm. in length*).

1. **L. caerùlea** L., var. **villòsa** (Michx.) T. & G. (MOUNTAIN FLY H.) Low (3–9 dm. high); *branches upright;* leaves oval, downy when young; bracts awl-shaped, longer than the ovaries which are united into one *blue* edible *berry; calyx-lobes glabrous;* corolla yellowish. — Low woods and bogs, Lab. to Alaska, s. to Pa., Mich., Wisc., Minn., etc. May, June.

2. **L.** MORRÒWI Gray. Shrub, 1.5–2 m. high, soft-downy; *branches spreading;* leaves oblong, rounded or subcordate at base, dark green and somewhat rugose above, much paler and grayish-tomentose beneath, obtuse or barely acutish; *calyx-teeth hirsute or ciliate;* corolla-lobes subequal, nearly as long as the tube, widely spreading, white or cream-colored; *berries bright red.* — Frequently cultivated, and now locally established in e. Mass. (Introd. from Japan.)

= = *Peduncles long and slender* (1.4–3 *cm. in length*).

3. **L.** TATÁRICA L. (TARTARIAN H.) *Smooth* shrub, 1.5–3 m. high; leaves thin, glabrous, entire, cordate-oval, on short petioles; *corolla* showy, *white or rose-colored; the lobes subequal, widely spreading, nearly as long as the tube;* berries united at the base, red or orange. — Escaped from cultivation and established on rocky shores and sheltered banks, Me. to Ont., N. J., and Ky. May, June. (Introd. from Asia.)

4. **L. canadénsis** Marsh. (AMERICAN FLY H.) Branches straggling, 1–1.5 m. high; *leaves* ovate-oblong, often heart-shaped, petioled, thin, downy beneath when young, *ciliate; corolla* funnel-form, 2 cm. long, *greenish-yellow, the lobes much shorter than the tube;* berries separate, red. (*L. ciliata* Muhl.) — Woods, e. Que. to Sask., s. to Pa., Mich., Wisc., and Minn. Apr.–June.

++ ++ *Corolla strongly bilabiate, the lips of very unequal breadth, the upper shallowly 4-lobed, the lower of a single entire lobe.*

5. **L.** XYLÓSTEUM L. (EUROPEAN FLY H.) Erect shrub, 1–2 m. high; *leaves broadly oval, thin,* very pubescent beneath, especially when young; *peduncles rather short* (8–12 mm. in length), *thickish;* bracts and calyx pubescent; corolla yellowish; berries separate, red. — Escaping from cultivation and becoming locally established in s. N. E., N. Y., and N. J. (Introd. from Eu.)

6. **L. oblongifòlia** (Goldie) Hook. (SWAMP FLY H.) Shrub, 5–15 dm. high; branches upright; *leaves* 2–7 cm. long, *oblong,* downy when young, smooth when old; *peduncles slender,* 1.5–4 *cm. long;* bracts minute or deciduous; corolla deeply 2-lipped, 1–1.5 cm. long, yellowish-white; berries red or purplish, united or nearly distinct. — Larch and Arbor Vitae swamps, n. N. B. to Man., s. to Me., Vt., N. Y., w. Pa., Mich., and Minn. May–July.

+ + *The two flowers involucrate by* 4 *conspicuous and broad foliaceous bracts.*

7. **L. involucràta** (Richards.) Banks. Pubescent, or becoming glabrous; branches 4-angular; leaves 0.5–1.5 dm. long, exceeding the peduncle, ovate-oblong, mostly pointed, petioled, and with a strong midrib; corolla yellowish, viscid-pubescent, cylindraceous, 1–1.5 cm. long; ovaries and globose dark purple berries distinct. — Woods and banks of streams, n. N. B. and e. Que., shores of L. Superior, northw. and westw. June, July.

* * *Twining or trailing shrub.*

8. **L.** JAPÓNICA Thunb. (JAPANESE H.) Pubescent; leaves ovate or oblong, thickish, entire, short-petioled; peduncles rather short; bracts leaf-like, con-

spicuous; corolla white, pink, or yellow, the slender pubescent tube 2.5 cm. long; berries black. — Escaped from cultivation and established in woods and thickets, Ct. to Fla. May–July. (Introd. from Asia.)

§ 2. CAPRIFÒLIUM [Tourn.] Pers. *Twining shrubs, with the flowers in sessile whorled clusters from the axils of the often connate upper leaves, forming interrupted terminal spikes; calyx-teeth persistent on the red or orange berry.*

* *Corolla trumpet-shaped, almost regular; stamens and style little exserted.*

9. **L. sempérvirens** L. (TRUMPET H.) Branches and upper surface of the leaves glabrous or nearly so; flowers in somewhat distant whorls, scentless, nearly 5 cm. long, deep red outside, yellowish within or rarely throughout, glabrous; leaves oblong, smooth, the lower petioled, the uppermost pairs connate. — Copses, Me. to Neb., and southw.; common in cultivation. May–Oct. — Leaves deciduous at the north. Var. HIRSÙTULA Rehder. Branchlets villous or glandular-pubescent; upper surface of leaves appressed-villous; corolla externally pubescent. — Va. and N. C.

* * *Corolla ringent; the lower lip narrow, the upper broad and 4-lobed; stamens and style conspicuously exserted.*

+ *Corolla-tube 2–2.5 cm. long, glabrous inside; stamens and style glabrous.*

10. **L. CAPRIFÒLIUM** L. ("AMERICAN" or ITALIAN WOODBINE.) Leaves smooth, glaucous beneath, obovate, the 2 or 3 upper pairs united; flowers whorled in the uppermost axils; corolla whitish, with a purple tube, fading yellowish, not gibbous at base, fragrant. (*L. grata* Ait.) — Rocky woodlands, N. Y., N. J., and Pa. to Mich., Mo., and southw.; escaped from cultivation. May, June. (Introd. from Eu.)

+ + *Corolla hairy within, the tube 1.3 cm. long or less.*

++ *Branches glandular-villous; leaves pubescent on both sides.*

11. **L. hirsùta** Eat. (HAIRY H.) Twining and rather high-climbing; *leaves ciliate*, deep green and more or less *appressed-setulose above, downy-hairy beneath, as well as the branches*, veiny, dull, broadly oval, the uppermost united, the lower short-petioled; flowers in approximate whorls; *corolla* 2–2.5 cm. long, orange-yellow, *clammy-pubescent;* the tube slightly gibbous at base, *slender.*— Damp copses and rocks, w. N. E. to Pa., Mich., and Man. July. — A coarse large-leaved species.

++ ++ *Branches glabrous; leaves glabrous above.*

= *Corolla mostly 1.2–2.4 cm. long.*

12. **L. Sullivántii** Gray. *Much whitened* with glaucous bloom, 1–2 m. high, *glabrous except for a slight puberulence on the lower surface of the leaves; disk of the uppermost connate leaves orbicular* or nearly so, *its ends rounded* or often retuse, sometimes slightly mucronate; inflorescence tending to elongate; corolla pale yellow; the tube 1–1.5 cm. long, slightly gibbous at the base; filaments nearly glabrous. — Rocky woods or banks, Tenn. to O., centr. Ia., and Minn.

13. **L. glaucéscens** Rydb. *Less glaucous; leaves* glabrous above but *decidedly pubescent beneath*, the uppermost connate ones forming a somewhat *oblong or rhombic disk, usually pointed acutely or obtusely at the ends*, the margin cartilaginous, not ciliate; corolla pale yellow, 1.2–2 cm. long, the pubescent tube gibbous at the base; ovary glabrous or nearly so. — Ont. and Man., s. to Va., O., and Neb. Var. DASÝGYNA Rehder. Ovary densely hirsute and somewhat glandular. — O.

14. **L. dioíca** L. Glabrous, 1–3 m high; *leaves* oblong, 5–10 cm long, glaucous and *glabrous beneath*, the upper 1–4 pairs connate into disks; even the uppermost *disks somewhat oblong or rhombic, more or less pointed (at least obtusely) at each end;* corolla greenish-yellow or purplish, the tube barely 1 cm.

long, hirsute within; style and stamens also hairy. (*L. glauca* Hill.)—Rocky grounds, s. Me. to Man., s. to N. C., O., and Mo. May, June.

= = *Corolla about 3 cm. long.*

15. **L. flàva** Sims. (Yellow H.) Leaves oblong to oval, the uppermost united into oval disks, dark green, not glaucous above, but pale or glaucous beneath; inflorescence short, capitate; corolla orange-yellow, the tube not gibbous at base, only slightly hairy within.—Mts. of N. C. to Ky., Mo., and southw. Apr., May.

3. SYMPHORICÁRPOS [Dill.] Ludwig. Snowberry

Calyx-teeth short, persistent. Corolla bell-shaped, regularly 4–5-lobed, with as many short stamens inserted into the throat. Berry 4-celled, 2-seeded. Seeds bony.—Low and branching upright shrubs, with oval short-petioled leaves, which are usually downy underneath and entire, or wavy-toothed or lobed on the young shoots. Flowers white, tinged with rose-color, in close short spikes or clusters. (Name composed of *συμφορεῖν, to bear together*, and *καρπός, fruit;* from the clustered berries.)

* *Style bearded; fruit red; flowers all in short dense axillary clusters.*

1. **S. orbiculàtus** Moench. (Indian Currant, Coral-berry.) Flowers in the axils of nearly all the leaves; corolla sparingly bearded; berries small. (*S. vulgaris* Michx.; *S. Symphoricarpos* MacM.)—Rocky banks, N. Y. to Dak., s. to Ga. and Tex.; escaping from cultivation eastw. July.

* * *Style glabrous; fruit white; flowers in clusters or sometimes solitary.*

2. **S. occidentàlis** Hook. (Wolfberry.) *Flowers in dense terminal and axillary spikes; corolla funnel-form*, much bearded within; *stamens and style protruded.*—Rocky ground, n. Mich. and Ill. to Kan., w. to the Rocky Mts.

3. **S. racemòsus** Michx. (Snowberry.) Shrub, 2–10 dm. high; *leaves* from elliptic-oblong to orbicular, *green both sides, pilose beneath; flowers* 1–2, *or in short interrupted spikes at the ends of the branches; corolla campanulate*, bearded inside; *stamens and style included.* (Var. *pauciflorus* Man. ed. 6, in part, not Robbins; *S. pauciflorus* Britton, in part.)—Dry limestone ridges and banks, n. e. Que. to Alaska, s. to w. Mass., centr. Pa., Mich., Mont., Ida., and Cal. June, July.

Var. **pauciflòrus** Robbins. Dwarf shrub; *leaves* more or less pubescent, *strongly whitened underneath.* (*S. pauciflorus* Britton, in part.)—L. Superior to L. Winnipeg; and locally in the mts. from Alb. to Ore. and Col.

Var. **laevigàtus** Fernald. (Snowberry of the gardens.) Taller shrub (1–1.5 m. high); *leaves glabrous beneath;* flowers often numerous in interrupted spikes. (*S. racemosus* of auth., not Michx.)—Saguenay Co., Que., to Wash., locally in the mts. to Va.; freely cultivated and commonly escaping to roadsides, etc.

4. LINNAÈA [Gronov.] L. Twin-flower

Calyx-teeth 5, awl-shaped, deciduous. Corolla slender-bell-shaped or funnel-form, almost equally 5-lobed. Stamens 4, two of them shorter, inserted toward the base of the corolla. Ovary and the small dry pod 3-celled, but 1-seeded.—A slender creeping and trailing little evergreen, somewhat hairy, with rounded-oval sparingly crenate leaves contracted at the base into short petioles, and thread-like upright peduncles forking into 2 (rarely 4 or 6) pedicels at the top, each bearing a delicate and fragrant nodding flower. Corolla whitish, tinged and striped with rose-purple, hairy inside. (Dedicated to the immortal *Linnaeus*, who first pointed out its characters, and with whom the European type of this pretty little plant was a special favorite.)

1. **L. boreàlis** L., var. **americàna** (Forbes) Rehder.—Moist mossy woods and cold bogs, Lab. to N. J. and the mts. of Pa. and Md., w. to Minn.; also far northw. and westw. June–Aug.; rarely flowering in late autumn.

5. TRIÓSTEUM L. Feverwort. Horse Gentian

Calyx-lobes linear-lanceolate, leaf-like, persistent. Corolla tubular, somewhat equally 5-lobed, scarcely longer than the calyx. Ovary mostly 3-celled, in fruit forming a dry drupe containing 3 ribbed 1-seeded bony nutlets. — Coarse hairy perennial herbs, leafy to the top; the ample entire pointed leaves tapering to the base or connate round the simple stem. Flowers solitary or clustered in the axils. (Name an abbreviation of *Triosteospermum*, alluding to the three bony nutlets.)

1. **T. perfoliàtum** L. (Tinker's Weed, Wild Coffee.) Coarse, 0.5 to 1.2 m. high; *stem densely glandular-puberulent* above; *leaves* dark green, thickish, oval, the primary ones abruptly *narrowed* below *to connate-clasping bases* 2–7 *cm. broad*, the uppermost tapering or scarcely connate at base; *corolla tubular-campanulate, hardly bilabiate*, from purplish to yellowish or greenish, *about equaling the stamens;* fruits usually 6–8 at each node, subglobose, dull orange-yellow. — Rich low woods, s. Mass. to Neb., Mo., and Ala. Fl. May, June; fr. Aug., Sept.

2. **T. aurantiacum** Bicknell. Sparingly glandular-puberulent, and *with spreading longer glandless hairs*, or glabrate; *leaves* ovate-oblong to oblong-lanceolate, abruptly *narrowed* below *to winged sessile hardly clasping bases* (0.5 *to* 1.5 *cm. broad*); *corolla dilated above, distinctly bilabiate, purplish-red, much exceeding the stamens;* fruits 2–6 at each node, ellipsoid-ovoid, bright orange-red. — Open rocky or sandy woods, N. B. to Ont., Ia., and N. C. Fl. May, June; fr. Aug.–Oct.

3. **T. angustifòlium** L. Smaller, *bristly-hairy; leaves lanceolate, tapering to the base;* flowers greenish-cream-color, mostly single in the axils. — Shady grounds, Ct. to Del. and Ala., w. to Mo. Fl. May; fr. Aug.

6. VIBÚRNUM [Tourn.] L. Arrow-wood. Laurestinus

Calyx 5-toothed. Corolla spreading, deeply 5-lobed. Stamens 5. Stigmas 1–3. Fruit a 1-celled 1-seeded drupe, with soft pulp and a thin-crustaceous (flattened or tumid) stone. — Shrubs, with simple leaves, and white (rarely pink) flowers in flat compound cymes. Petioles sometimes bearing little appendages which are evidently stipules. Leaf-buds naked, or with a pair of scales. (The classical Latin name, of unknown meaning.)

a. Cyme radiant, the marginal flowers neutral and very showy.
  Leaves pinnately veined, not lobed . . . . . 2. *V. alnifolium.*
  Leaves palmately veined, 3-lobed . . . . . 3. *V. Opulus.*
a. Cymes not radiant, the flowers all small and uniform *b.*
  b. Leaves for the most part palmately veined and 3-lobed.
    Leaves glabrous; drupe bright red; stone flat . . . . . 4. *V. pauciflorum.*
    Leaves soft-downy beneath; drupe finally purple-black; stone lenticular . . . . . 5. *V. acerifolium.*
  b. Leaves pinnately veined, not lobed *c.*
    c. Leaves prominently toothed and with straightish veins; stone grooved *d.*
      d. Stipules slender, prominent, exceeding the very short petioles; stone flat . . . . . 6. *V. pubescens.*
      d. Stipules wanting or much shorter than the petioles; stone deeply grooved.
        Winter-buds naked; leaves finely toothed . . . . . 1. *V. Lantana.*
        Winter-buds covered by scales; leaves coarsely toothed.
          Petioles stipulate; bark of older branches loose and exfoliating 7. *V. molle.*
          Petioles without stipules; bark close.
            Lower surface of leaves, petioles, and young branchlets stellate-tomentose.
              Principal leaves with 7–11 pairs of veins, the teeth acute . 8. *V. venosum.*
              Principal leaves with 5–7 pairs of veins, the teeth blunt . 9. *V. scabrellum.*
            Lower surface of leaves and petioles glabrous, or with simple caducous hairs . . . . . 10. *V. dentatum.*
    c. Leaves finely toothed or entire; the veins inconspicuous, curved and anastomosing; stone flat and even *e.*
      e. Cymes peduncled; drupes less than 1 cm. long.
        Peduncle usually shorter than the rays of the cyme; leaves dull above . . . . . 11. *V. cassinoides.*

Peduncle usually longer than the rays; leaves glossy above . 12. *V. nudum.*
a. Cymes sessile; drupes more than 1 cm. long.
Leaves subtending the inflorescence mostly caudate-acuminate . 13. *V. Lentago.*
Leaves blunt or merely acutish.
Winter-buds and petioles green and glabrous . . . . . 14. *V. prunifolium.*
Winter-buds and petioles red-tomentose . . . . . 15. *V. rufidulum.*

§ 1. LANTÀNA Spach. *Winter-buds naked; leaves pinnately veined; drupes coral-red, turning darker, not acid; stone sulcate.*

1. **V. Lantàna** L. (Wayfaring Tree.) Shrub or small tree; the buds, young branches, lower surface of the leaves, etc., cinereous with minute stellate pubescence; leaves cordate-ovate to broad-oblong, closely serrulate; *cymes short-peduncled, about 7-rayed; the flowers small and all alike.* — Frequently cultivated, and occasionally established by roadsides, etc. (Introd. from Eurasia.)

2. **V. alnifòlium** Marsh. (Hobble-bush, Witch Hobble, Moosewood.) Leaves 1–2 dm. across, round-ovate, abruptly pointed, heart-shaped at the base, closely serrate, the veins and veinlets beneath with the stalks and branchlets very rusty-scurfy (midsummer leaves sometimes narrower, coarsely toothed, thin and glabrous); *cymes sessile, commonly 5-rayed,* very broad and flat, *the marginal flowers neutral, with greatly enlarged flat* white (rarely pink) *corollas.* (*V. lantanoides* Michx.) — Moist woods, N. B. to Ont. and Mich., s. to Pa., and in the mts. to N. C. May, June. — A straggling shrub; the reclining branches often taking root.

§ 2. ÓPULUS [Tourn.] DC. *Winter-buds scaly; leaves palmately veined and lobed; drupe bright red, acid, globose; stone very flat, orbicular, not sulcate.*

3. **V. Ópulus** L., var. **americànum** (Mill.) Ait. (Cranberry-tree, Highbush Cranberry, Pimbina.) Nearly smooth, *upright,* 1–4. *m. high;* leaves 3–5-ribbed, strongly 3-lobed, broadly wedge-shaped or truncate at base, the spreading lobes pointed, mostly toothed on the sides, entire in the sinuses; petioles bearing 2 glands at the apex; *cyme broad, the marginal flowers neutral, with greatly enlarged flat corollas;* stamens elongate. (*V. americanum* Mill.) — In woods and along streams, Nfd. and e. Que. to B. C., s. to N. J., Pa., Mich., Wisc., and n. e. Ia. June, July. (E. Asia.) — The acid fruit of this and the next is a substitute for cranberries. The well-known Snow-ball Tree, or Guelder Rose, is a cultivated state of the typical Old World form, with the whole cyme turned into showy sterile flowers.

4. **V. paucifòrum** Raf. (Squashberry, Pimbina.) *A low straggling shrub;* leaves glabrous or loosely pubescent beneath, 5-ribbed at base, unequally serrate nearly all round, with 3 short lobes at the summit; *cyme few-flowered, the flowers small and uniform;* stamens shorter than the corolla. — Cold woods, Nfd. and Lab. to Alaska, s. to the mts. of Cape Breton I., n. N. E., Allegheny Co., Pa. (according to Porter), n. Mich., Minn., Col., and Wash. June, July.

§ 3. EUVIBÚRNUM Koehne (restricted). *Winter-buds scaly; leaves pinnately veined (except in no. 5), the veins straightish and terminating in coarse teeth; cymes never radiant, peduncled; drupes blue to black; stone usually grooved.*

* *Leaves 3-ribbed from the rounded or subcordate base, somewhat 3-lobed.*

5. **V. acerifòlium** L. (Dockmackie, Arrow-wood.) Shrub, 1–1.5 m. high; leaves soft-downy beneath, the pointed lobes diverging, unequally toothed; stipules bristle-form; cymes small, slender-peduncled; stamens exserted; fruit crimson, turning purple-black; stone lenticular, hardly sulcate. — Rocky woods, N. B. to Minn., Ky., and Ga. May, June. — Leaves crimson in autumn.

** *Leaves cordate or subcordate at base, coarsely toothed, prominently pinnate-veined.*

+ *Stone flat; leaves all short-petioled or subsessile.*

6. **V. pubéscens** (Ait.) Pursh. (Downy A.) A low straggling shrub; leaves ovate or oblong-ovate, acute or taper-pointed, the veins and teeth fewer and less

conspicuous than in no. 10, the lower surface and very short petioles soft-downy, at least when young; fruit dark purple; the stone slightly 2-sulcate on the faces. — Calcareous ridges and banks, w. Que. and Vt. to Man., s. to Ga., Ill., Ia., and Wyo. May, June.

← ← *Stone very deeply sulcate ventrally; leaves rather slender-petioled.*

7. **V. mólle** Michx. Shrub, 3–4 m. high, with *gray exfoliating bark;* leaves suborbicular or broadly ovate, short-acuminate, cordate, coarsely dentate, dark green and glabrous above, pale and soft-pubescent beneath, 5–13 cm. long, on petioles 2–4 cm. long; *stipules rather short*, finally deciduous; *fruit dryish, ellipsoid, 1 cm. long*, much compressed; stone deeply grooved. (*V. Demetrionis* Deane & Robinson.) — Bluffs and rocky woods, Ky. (and probably O.), Mo., and Ia. May.

8. **V. venòsum** Britton. Shrub, with *close gray-brown bark, the young branches cinereous with stellate tomentum; leaves elliptic-ovate to orbicular*, 3–6 cm. long, *sharply serrate-dentate*, dark green above, beneath pale with stellate tomentum and *with 7–9 pairs of prominent veins;* cymes 4–6 cm. broad, the long peduncle and 7 rays pubescent; drupe subglobose or short-ovoid, 7 mm. long. (*V. molle* Man. ed. 6, in part, not Michx.) — Dry open soil, Martha's Vineyard and Nantucket to Pa. and Del. June, July. Var. CÁNBYI Rehder. Leaves larger (5–8 cm. long), glabrous or glabrate beneath; cymes 7–9 cm. broad. — Pa. and Del. to the mts. of Va.

9. **V. scabréllum** (T. & G.) Chapm. Similar; *branches reddish-brown; leaves oblong to obovate*, rarely orbicular, 4–10 dm. long, *shallowly crenate-dentate, with 5–7 pairs of less prominent veins;* cymes similar, the flowers larger. (*V. molle* Man. ed. 6, in part, not Michx.; *V. semitomentosum* Rehder.) — Woods and banks of streams, Pa. to Fla. and Tex. June.

10. **V. dentàtum** L. (ARROW-WOOD.) *Smooth*, 1–4.5 m. high, with ash-colored bark; *leaves* broadly ovate, *glabrous*, or with hairy tufts in the axils beneath, very numerously sharp-toothed and strongly veined, 5–8 cm. long; fruit globose-ovoid, 6 mm. long; cross-section of stone between kidney- and horseshoe-shaped. — Wet places, N. B. to n. Ga., w. to w. N. Y. and s. Ont. June, July.

§ 4. TÌNUS (Borkh.) Koehne. *Winter-buds with opposite scales; leaves finely toothed or entire, pinnately veined, the veins curved and anastomosing near the margin; drupes blue or black, sweet; stone flat and even.*

11. **V. cassinoìdes** L. (WITHE-ROD, WILD RAISIN.) Shrub or small tree, 0.5–3.6 m. high; shoots scurfy-punctate; *leaves* thickish and *opaque or dull*, ovate to oblong, mostly with obtuse acumination, *obscurely veiny*, 2.5–10 cm. long, *with margins irregularly crenulate-denticulate* or sometimes entire; *peduncle shorter than the usually 5-rayed cyme;* drupe ellipsoid to spherical, 6–9 mm. long, yellowish and pink when young, finally blue-black, with a bloom. — Swamps and open situations, Nfd. to N. C., Minn., and Man. June, July.

12. **V. nùdum** L. Similar; obscurely scurfy-punctate; *leaves more veiny*, thickish, oval, oblong or lanceolate, entire or obsoletely denticulate, *lucid above*, 5–10 cm. long; *peduncle usually equaling the cyme.* — Ct. to Ky., Fla., and Tex.

13. **V. Lentàgo** L. (SWEET VIBURNUM, SHEEPBERRY, NANNYBERRY, WILD RAISIN.) Shrub or tree, sometimes 9 m. high; *leaves ovate, closely and very sharply serrate*, at least *the upper caudate-acuminate and on winged petioles; cyme sessile*, 6–10 cm. broad, 3–4-*rayed; drupe* ovoid or ellipsoid, blue-black, 1–1.5 *cm. long.* — Woods and banks of streams, Que. to Man., and southw. May, June. An extreme form with spherical fruit 8–10 mm. in diameter has been distinguished as var. SPHAEROCÁRPUM Gray.

14. **V. prunifòlium** L. (BLACK HAW.) Tall shrub or small tree; *leaves oval, obtuse* or slightly pointed, *finely and sharply serrate*, 2–7 cm. long, *the lower surfaces and* slender or slightly winged *petioles glabrous;* cyme 3–5-rayed; fruit ellipsoid or ovoid, similar to that of the preceding species or rather smaller. — Dry or moist ground, Ct. to Mich., Kan., and southw. May, June. The extreme form with smaller globose fruit is var. GLOBÒSUM Nash.

15. **V. rufídulum** Raf. Similar; the *winter-buds, wing-margined petioles, and lower leaf-surfaces red-tomentose;* leaves often larger (4–9 cm. long). (*V. rufotomentosum* Small.) — Woods and thickets, Va. to Ill., Kan., and southw. Apr., May.

7. SAMBÙCUS [Tourn.] L. ELDER

Calyx-lobes minute or obsolete. Corolla open-urn-shaped, with a broadly spreading 5-cleft limb. Stamens 5. Stigmas 3. Fruit a berry-like juicy drupe, containing 3 small seed-like nutlets. — Shrubby plants, with a rank smell when bruised, pinnate leaves, serrate-pointed leaflets, and numerous small flowers in compound cymes. (The Latin name, perhaps from σαμβύκη, an ancient musical instrument.)

1. **S. canadénsis** L. (COMMON E.) Stems scarcely woody, 1–4 m. high, with *white pith; leaflets* 5–11, *oblong*, mostly smooth, the lower often 3-parted; *cymes flat;* flowers white; *fruit black-purple.* — Rich soil, in open places, throughout our range, also southw. and westw. June, July.

2. **S. racemòsa** L. (RED-BERRIED E.) Stems woody, 0.5–3.5 cm. high, the bark warty, the *pith brown; leaflets* 5–7, *ovate-lanceolate, downy underneath; cymes panicled, convex or pyramidal;* flowers yellowish-white, sometimes tinged with crimson; *fruit bright red* (rarely white). (*S. pubens* Michx.) — Rocky woods, Nfd. to B. C., s. to Ga., Mich., Ia., Col., etc. May; fruit ripening in June. (Eu.) Var. LACINIÀTA Koch. Leaflets divided into linear-lanceolate or laciniate segments. — L. Superior and "Pa."

8. ADÓXA L. MOSCHATEL

Calyx-tube reaching not quite to the summit of the 3–5-celled ovary; limb of 3 or more teeth. Corolla wheel-shaped, 4–6-cleft, bearing at each sinus a pair of separate or partly united stamens with 1-celled anthers. Style 3–5-parted. Dry drupe greenish, with 3–5 cartilaginous nutlets. — A dwarf perennial, with scaly rootstock and ternately divided leaves, the cauline a single pair. An anomalous genus. (From ἄδοξος, *obscure* or *insignificant.*)

1. **A. Moschatéllina** L. Smooth, musk-scented; radical leaves 1–3-ternate, the cauline 3-cleft or 3-parted; leaflets obovate, 3-cleft; flowers several in a close cluster on a slender peduncle, greenish or yellowish. — Mossy woods, wet rocks, etc., n. e. Ia., Wisc., Minn., and northw. June, July. (Eurasia.)

VALERIANÀCEAE (VALERIAN FAMILY)

Herbs, with opposite leaves and no stipules; the calyx-tube adherent to the ovary, which has one fertile 1-*ovuled cell and two abortive or empty ones; the stamens distinct,* 1–3, *fewer than the lobes of the corolla, and inserted on its tube.* Corolla tubular or funnel-form, often irregular, mostly 5-lobed, the lobes imbricated in the bud. Style slender; stigmas 1–3. Fruit indehiscent, 1-celled (the two empty cells of the ovary disappearing), or 3-celled, two of the cells empty, the other 1-seeded. Seed suspended, anatropous, with a large embryo and no albumen. Flowers in panicled or clustered cymes. — Roots often odorous and antispasmodic.

1. **Valeriana.** Calyx-limb of several plumose bristles. Perennials.
2. **Valerianella.** Calyx-limb entire or merely toothed. Annuals or biennials.

1. VALERIÀNA [Tourn.] L. VALERIAN

Calyx-limb of several plumose bristles (like a pappus) which are rolled up inward in flower, but unroll and spread as the seed-like 1-celled fruit matures. Corolla commonly gibbous near the base, the 5-lobed limb nearly regular. Sta-

mens 3. — Perennial herbs, with thickened strong-scented roots, and simple or pinnate leaves. Flowers in many species imperfectly dioecious or dimorphous. (A mediaeval Latin name of uncertain origin.)

* *Root spindle-shaped, large and deep,* 1.5–3 *dm. long; leaves thickish.*

1. V. edùlis Nutt. Smooth, or minutely downy when very young; stem straight, 3–12 dm. high, few-leaved; leaves commonly minutely and densely ciliate, the basal spatulate and lanceolate, the cauline pinnately parted into 3–7 long and narrow divisions; flowers in a long and slender interrupted panicle, nearly dioecious; corolla whitish, obconical, 4 mm. long. — Wet plains and prairies, O. and Ont. to Ia., Minn., and westw.; sometimes cultivated, and escaping eastw. May, June.

* * *Root fibrous; leaves thin; stems* 3–15 *dm. high.*

2. V. uliginòsa (T. & G.) Rydb. (Swamp V.) Smooth or minutely pubescent; *root-leaves ovate or oblong, entire,* rarely with small lobes; stem-leaves pinnate, with 7–15 oblong-ovate or lanceolate nearly entire leaflets; cyme at first close, many-flowered; *corolla inversely conical,* 6 mm. long, rose-color or white. (*V. sylvatica* Man. ed. 6, not Banks.) — Wet ground, chiefly under Arbor Vitae and Larch, e. Que. to w. Ont., s. to Me., Vt., s. N. Y., and Mich. June–Aug.

3. V. officinàlis L. (Garden Heliotrope.) Coarse, somewhat pubescent, especially at the nodes; *leaves all pinnate,* with many lanceolate leaflets; cyme many-flowered; corolla white or rose-color, 4 mm. long. — Roadsides and thickets, N. E. to N. J. and O.; escaped from cultivation. (Nat. from Eu.)

4. V. pauciflòra Michx. Smooth, slender, surculose; *root-leaves ovate, heart-shaped, toothed,* pointed, sometimes with 2 small lateral divisions; stem-leaves pinnate, with 3–7 ovate toothed leaflets; branches of the panicled cyme few-flowered; *tube of the* pale pink *corolla slender,* 1 *cm. long.* — Woods and alluvial banks, Pa. to s. Ill., Mo., and Tenn. June.

2. VALERIANÉLLA [Tourn.] Hill. Corn Salad. Lamb's Lettuce

Limb of the calyx obsolete or merely toothed. Corolla funnel-form or salver-form, equally or unequally 5-lobed. Stamens 3, rarely 2. Fruit 3-celled, two of the cells empty and sometimes confluent into one, the other 1-seeded. — Annuals and biennials, usually smooth, with forking stems, tender and rather succulent leaves (entire or cut-lobed toward the base), and white or pale cymose-clustered and bracted small flowers. Our species all have the limb of the calyx obsolete, and are so much alike in aspect, flowers, etc., that good characters are to be taken only from the fruit. (Name a diminutive of *Valeriana.*)

§ 1. *Corolla nearly regular, funnel-form; the tube short; fruit with* 2 *empty cells manifest, or often enlarged and closed, sometimes confluent into* 1 *cell.*

* *Corolla bluish; fruit with a corky mass at the back of the fertile cell.*

1. V. Locústa (L.) Betcke. Fruit flattish, obliquely rhomboidal; empty cells as large as the fertile, contiguous, the thin partition at length breaking up. (*V. olitoria* Poll.) — Old fields and waste places, Me. to w. N. Y., Ont., and southw. — Sometimes cultivated for salad. (Introd. from Eu.)

* * *Corolla white; no corky mass behind the fertile cell.*

+ *Fertile cell broader than the empty ones; cross-section of fruit triangular.*

2. V. chenopodifòlia (Pursh) DC. Stems with long internodes and few forks; glomerate cymes few, slender-peduncled; bracts broadly lanceolate; fruit glabrous or pubescent, 4 mm. long. — Moist grounds, w. N. Y. to Minn., s. to Va. and Ky.

+ + *Fertile cell as broad as the empty ones, beaked; cross-section quadrate.*

3. V. radiàta (L.) Dufr. *Fruit* ovate-tetragonal, *downy-pubescent;* empty cells as thick as the oblong-ovate fertile one, or thicker, *a broad shallow groove*

between them. — Low grounds, Mass. to Minn., Tex., and Fla. Var. LEIOCÁRPA (T. & G.) Krok. Fruit glabrous. — Of similar range, not rare.

4. V. stenocárpa (Engelm.) Krok. *Fruit* oblong-tetragonal, *commonly glabrous;* oblong fertile cell thicker than the linear-oblong approximate empty ones. — Mo. and Kan. to Tex.

+ + + *Fertile cell much the narrowest, dorsally* 1-*nerved; section roundish.*

5. V. Woodsiàna (T. & G.) Walp. Fruit 2 mm. long or more; fertile cell ovate, tipped with a tooth; empty ones inflated, with oblong depression (sometimes an open cavity) in the middle. — Moist grounds, N. Y. to Tex.

Var. umbilicàta (Sulliv.) Gray. Empty cells becoming confluent, vesicular by incurvation of the circular margin, forming a deep and round umbilication.— N. Y. to O., and southw.

Var. patellària (Sulliv.) Gray. Fruit saucer-shaped, emarginate at base and apex, winged by the divergent cells. — Same range.

§ 2. SIPHONÉLLA (T. & G.) Walp. *Corolla salver-form; the tube slender,* 2–4 *times the length of the bilabiate limb; fruit with divergent empty cells much larger than the fertile.*

6. V. longiflòra (T. & G.) Walp. — Erect several times dichotomously branched annual; leaves oblong, the lower spatulate; corolla 12 mm. long, rose-tinged or purplish. — Rocky places, Mo. and Ark.

DIPSACÀCEAE (TEASEL FAMILY)

Herbs, with opposite or whorled leaves, no stipules, and the flowers in dense heads, surrounded by an involucre, as in the Composite Family; *but the stamens distinct, and the suspended seed destitute of albumen.* — Represented by the following introduced genera.

1. **Dipsacus.** Chaff of the receptacle with long rigid points.
2. **Succisa.** Chaff herbaceous, about equaling the flowers, not rigid-pointed.
3. **Knautia.** Chaff none.

1. DÍPSACUS [Tourn.] L. TEASEL

Involucre many-leaved, longer than the chaffy leafy-tipped bracts among the densely capitate flowers; each flower with a 4-leaved calyx-like involucel investing the ovary and fruit (achene). Calyx-tube adherent to the ovary, the limb cup-shaped, without a pappus. Corolla nearly regular, 4-cleft. Stamens 4, inserted on the corolla. Style slender. — Stout and coarse biennials, hairy or prickly, with large ovoid-ellipsoid heads. (Name from διψῆν, *to thirst,* probably because the united cup-shaped bases of the leaves in some species hold water.)

1. D. SYLVÉSTRIS Huds. (WILD T.) Prickly; *leaves lance-oblong, toothed and often prickly on the margin;* leaves of the involucre slender, ascending, longer than the head; bracts (chaff) tapering into a long flexible awn with a straight point. — Roadsides, rather rare. (Nat. from Eu.)

2. D. LACINIÀTUS L. *Leaves pinnatifid* or bipinnatifid, finely and rather conspicuously *ciliate;* leaves of the involucre lance-linear, spreading, usually shorter than the head. — Established at Albany, N. Y. (*Peck*). (Adv. from Eu.)

2. SUCCÌSA (Rupp.) Neck. DEVIL'S-BIT

Involucre many-leaved. Involucels (often called outer calyx) closely investing the ovary and fruit, 4–8-furrowed throughout their entire length, prismatic or somewhat fusiform, the limb shortly 4-lobed or -toothed, erect or spreading. Limb of the true calyx minutely 5-toothed, or of 5 awns. Corolla funnel-form or campanulate, 4(–5)-lobed. Stamens 4, borne on the corolla.

(Name from *succidere*, to bite off, from the praemorse rootstock.) Often united with SCABIOSA L.

1. S. PRATÉNSIS Moench. Smoothish or hairy, 4–9 dm. high; leaves chiefly basal, oblanceolate, undulate or entire, the cauline mostly 2 pairs, considerably reduced; heads subglobose; *involucels somewhat 4-angled, villous*, 4-toothed; *calyx-limb 5-awned;* corolla bright blue. (*Scabiosa Succisa* L.) — To some extent established in fields about Louisburg, Cape Breton I. (*Macoun*). (Adv. from Eu.)

2. S. AUSTRÀLIS (Wulf.) Reichenb. Tall, loosely and mostly trichotomously branched, covered above with minute crisped mostly reflexed gray hairs; leaves elongated-lanceolate; heads 8–15 mm. in diameter, at length subcylindric; *involucels glabrous, somewhat fusiform, 8-ribbed*, with small crenate-lobed spreading border; *calyx* shortly 5-toothed, *without awns;* corolla light blue. (*Scabiosa* Wulf.) — Locally established in meadows, etc., Mass., N. Y., and Pa. (Nat. from Eu.)

3. KNAÚTIA L.

Involucre, habit, etc., much as in the preceding. Chaff wanting, but the receptacle more or less hairy. Involucels strongly compressed, the limb obscure, at most indicated by minute teeth. Calyx cup-shaped, the limb mostly 8-awned. Corolla light blue to lilac-purple, rarely pink or white. (Dedicated to *Christian Knaut*, 1654–1716, Saxon physician and botanist.)

1. K. ARVÉNSIS (L.) T. Coulter. Pubescent, 4–9 dm. high, few-branched; some or all of the leaves deeply pinnatifid or bipinnatifid; heads depressed-hemispherical; corollas lilac. (*Scabiosa* L.) — Dry pastures, etc., e. Que. and N. E. to Pa., locally well established and abundant. (Nat. from Eu.)

CUCURBITÀCEAE (GOURD FAMILY)

Mostly succulent herbs with tendrils, dioecious or monoecious flowers, the calyx-tube adhering to the 1-3-celled ovary, and the 5 or usually 2½ stamens (*i.e.* 1 with a 1-celled and 2 with 2-celled anthers) *commonly united by their often tortuous anthers, and sometimes also by the filaments. Fruit* (pepo) *fleshy, or sometimes membranaceous.* Limb of the calyx and corolla usually more or less combined. Stigmas 2 or 3. Seeds large, usually flat, anatropous with no albumen. Cotyledons leaf-like. Leaves alternate, palmately lobed or veined. — Mostly a tropical or subtropical family.

* Flowers large, yellow; stem trailing.

1. **Cucurbita.** Corolla campanulate, deeply 5-lobed. Fruit large, indehiscent, fleshy.

** Flowers small, white or greenish; stems high-climbing by tendrils.

+ Fruit prickly; seeds few, erect or pendulous; flowers white; annual.

++ Ovary 1-celled; seed solitary, pendulous.

2. **Sicyos.** Corolla of the sterile flowers flat and spreading, 5-lobed. Fruit indehiscent.

++ ++ Ovary 2–3-celled; seeds few, erect or ascending.

3. **Echinocystis.** Corolla of the sterile flowers flat and spreading, 6-parted. Anthers 3. Fruit bladdery, 2-celled, 4-seeded, bursting at the top.

+ + Fruit smooth; seeds numerous, horizontal, attached to the 3–5 parietal placentae; perennial.

4. **Melothria.** Flowers small, greenish; corolla 5-parted. Slender, climbing. Fruit small.

1. CUCÚRBITA [Tourn.] L. GOURD. SQUASH. PUMPKIN

Flowers monoecious. Corolla campanulate, deeply 5-lobed, the lobes with recurved tips. Anthers united, 1 of them 1-locular, the others 2-locular. Style short, with 3 lobed or divided stigmas. Fruit fleshy, covered by a firm rind, with many horizontal seeds. — Herbs, with annual or perennial roots, large

cordate angulate or lobed leaves, large flowers solitary in the axils, and large fruits. (Classical Latin name for a gourd.)

1. **C. foetidíssima** H B K. (Missouri Gourd, Fetid Wild Pumpkin.) Stems elongate, scabrous, from a thickish fusiform root; leaves ovate, the margin somewhat angulate, denticulate, densely scabrous-pubescent, somewhat whitened beneath; corolla 5–12 cm. long; fruit smooth, subglobose, 7–8 mm. long. — Dry or sandy soil, Mo. to s. Cal. and Tex. (Mex.)

C. máxima Duchesne (Squash), C. moschàta Duchesne (Crookneck Squash), and C. Pèpo L. (Pumpkin) are familiar in cultivation, and incline to appear spontaneously in waste places southw., as do Cùcumis Mèlo L. (Muskmelon), C. satìvus L. (Cucumber), Citrúllus vulgàris Schrad. (Watermelon), and Lagenària vulgàris Ser. (Gourd).

2. SÍCYOS L. One-seeded Bur Cucumber

Flowers monoecious. Petals 5, united below into a bell-shaped or flattish corolla. Anthers cohering in a mass. Ovary 1-celled, with a single suspended ovule; style slender; stigmas 3. Fruit ovoid, dry and indehiscent, filled by the single seed, covered with barbed prickly bristles which are readily detached. — Climbing annuals, with 3-forked tendrils, and small whitish flowers; the sterile and fertile mostly from the same axils, the former corymbed, the latter in a capitate cluster, long-peduncled. (Greek name for the Cucumber.)

1. **S. angulàtus** L. Leaves roundish-heart-shaped, 5-angled or -lobed, the lobes pointed; plant clammy-hairy. — River-banks and damp yards, s. Me and w. Que. to Fla., w. to Minn., e. Kan., and Tex. July–Sept.

3. ECHINOCÝSTIS T. & G. Wild Balsam-apple

Flowers monoecious. Petals 6, lanceolate, united at the base into an open spreading corolla. Anthers more or less united. Ovary 2-celled, with 2 erect ovules in each cell; stigma broad. Fruit fleshy, at length dry, clothed with weak prickles, bursting at the summit, 2-celled, 4-seeded, the inner part fibrous-netted. Seeds large, flat, with a thickish hard and roughened coat. — Tall climbing annual, nearly smooth, with 3-forked tendrils, thin leaves, and very numerous small greenish-white flowers; the sterile in compound racemes often 3–4 dm. long, the fertile in small clusters or solitary, from the same axils. (Name composed of ἐχῖνος, *a hedgehog*, and κύστις, *a bladder*, from the prickly fruit.) Micrampelis Raf.

1. **E. lobàta** (Michx.) T. & G. Leaves deeply and sharply 5-lobed; fruit ovoid, 5 cm. long; seeds dark-colored. — Rich soil along rivers, N. B. to Pa. and Ky., w. to Man. and Tex.; also cultivated for arbors and freely escaping. July–Oct.

4. MELÒTHRIA L.

Flowers polygamous or monoecious; the sterile campanulate, the corolla 5-lobed; the fertile with the calyx-tube constricted above the ovary, then campanulate. Anthers more or less united. Berry small, pulpy, filled with many flat and horizontal seeds. — Tendrils simple. Flowers very small. (Altered from μήλωθρον, an ancient name for a sort of white grape.)

1. **M. péndula** L. Slender, from a perennial root, climbing; leaves small, roundish and heart-shaped, 5-angled or -lobed, roughish; sterile flowers few, in small racemes; the fertile solitary, greenish or yellowish; berry ovoid, green, 1 cm. long. — Copses, Pa. to Fla., w. to Mo. and La.

CAMPANULÀCEAE (Bluebell Family)

Herbs, with milky juice, alternate leaves, and scattered flowers; calyx adherent to the ovary; the regular 5-lobed corolla bell(rarely wheel)-shaped, valvate in the bud; the 5 stamens usually free from the corolla. Style 1, usually beset with collecting hairs above; stigmas 2 or more. Capsule 2–several-celled, many-

seeded. Seed small, anatropous, with a straight embryo in fleshy albumen. — Flowers generally blue and showy.

* Capsule opening by pores on the sides; anthers free.

1. **Specularia.** Corolla rotate. Capsule slender-cylindric or -prismatic.
2. **Campanula.** Corolla campanulate (rarely with flaring limb). Capsule obconic or turbinate to globose.

* * Capsule opening by valves at the apex; anthers connate at base.

3. **Jasione.** Flowers crowded into dense involucrate heads. Corolla with slender segments.

1 SPECULÀRIA [Heist.] Fabricius. Venus's Looking-glass

Calyx 5(or 3-4)-lobed. Corolla wheel-shaped, 5-lobed. Stamens 5, separate; the membranaceous hairy filaments shorter than the anthers. Stigmas 3. Capsule prismatic or slender-cylindric, 3-celled, opening by 3 small lateral valves. — Low annuals, with axillary blue or purplish flowers, in American species dimorphous, the earlier small and cleistogamous. (Name from *Speculum Veneris*, the early name of the common European species.) Legouzia Durande.

1. **S. perfoliàta** (L.) A. DC. Somewhat hairy, 1-9 dm. high; *leaves roundish or ovate, clasping by the heart-shaped base*, toothed; flowers sessile, solitary or 2-3 together in the axils, only the upper or later ones having a conspicuous and expanding corolla; *capsule ellipsoid, short, straight, opening rather below the middle;* seeds lenticular. (*Legouzia* Britton.) — Sterile open ground, s. Me. to Ont., westw. and southw.

2. **S. biflòra** (R. & P.) Fisch. & Mey. Similar; *leaves sessile, ovate or oblong*, the upper narrower, slightly crenate; flowers solitary or by 2's in the axils, the lower with 3-4 short calyx-lobes, the upper with 4-5 longer lobes hardly equaling the corolla; *capsule short-cylindric, the valves near the summit.* (*Legouzia* Britton.) — Va., westw. and southw.

3. **S. leptocárpa** (Nutt.) Gray. Minutely hirsute or nearly glabrous, 1.5-4 dm. high; *leaves lanceolate*, with flowers closely sessile in their axils; calyx-lobes of lower flowers 3; *capsule nearly cylindrical*, 1.5-2 *cm. long*, 2 *mm. thick, inclined to curve, opening by one or two uplifted valves near the summit;* seeds oblong. (*Legouzia* Britton.) — Dry open ground, w. Mo. and Ark. to Col. and w. Tex. — Expanded corolla 1-2 cm. wide.

2. CAMPÁNULA [Tourn.] L. Bellflower

Calyx 5-cleft. Corolla generally bell-shaped, 5-lobed. Stamens 5, separate; the filaments broad and membranaceous at the base. Stigmas and cells of the capsule 3 in our species, the short pod opening on the sides by as many valves or holes. — Herbs, with terminal or axillary flowers. (A diminutive of the Italian *campana*, a bell, from the shape of the corolla.)

a. Flowers in glomerules, spikes, or racemes, mostly numerous *b.*
  b. Flowers sessile, chiefly in glomerules or leafy-bracted heads . . 1. *C. glomerata.*
  b. Flowers distinctly pedicceled.
    Calyx and outer surface of unexpanded corolla bristly-ciliate with long pale trichomes . . . . . 2. *C. Trachelium.*
    Calyx and corolla smooth, or the former minutely pubescent; racemes elongate and spiciform.
      Corolla campanulate; style straight; capsule campanulate-ovoid, opening by pores at the base . . . . . 3. *C. rapunculoides.*
      Corolla rotate; style declined and upwardly curved; capsule obconic to subcylindric, the pores at the summit . . . . 4. *C. americana.*
a. Flowers 1-∞, on slender peduncles or in loose inflorescences *c.*
  c. Style not exserted.
    Stems smooth (rarely villous), not retrorse-scabrous on the angles; leaves not retrorse-scabrous on the nerves and margin . . 5. *C. rotundifolia.*
    Stems retrorse-scabrous on the angles; leaves with retrorse-scabrous nerves and margin.
      Corolla 2-3 cm. long . . . . . 6. *C. patula.*
      Corolla shorter.
        Peduncles strongly divergent; corolla 5-8 mm. long . . 7. *C. aparinoides.*
        Peduncles ascending; corolla 10-12 mm. long . . . . 8. *C. uliginosa.*
  c. Style long-exserted . . . . . 9. *C. divaricata.*

1. C. GLOMERÀTA L. (CLUSTERED B.) Somewhat hairy, stout and erect, 3–6 dm. high; *basal leaves lanceolate to oblong-ovate*, long-petioled; *stem-leaves* oblong or lanceolate, *cordate-clasping; flowers sessile*, clustered in the upper axils, *forming a leafy head;* corolla open-bell-shaped, deep purple, 2–3 cm. long. — Roadsides, Que. and e. Mass. June, July. (Introd. from Eurasia.)

2. C. TRACHÈLIUM L. (NETTLE-LEAVED B., THROATWORT.) Stems simple below, 3–9 dm. high, often bristly above; *basal leaves broadly cordate-ovate to reniform*, coarsely toothed; *the upper short-petioled or subsessile*, ovate to lanceolate; *flowers in 2's or 3's* (rarely solitary) *in* terminal and axillary *loose clusters;* calyx bristly, the oblong-lanceolate lobes somewhat foliaceous; corolla 2.5–3.5 cm. long. — Roadsides and thickets, Quebec to Montreal, etc. Aug. (Introd. from Eurasia.)

3. C. RAPUNCULOÌDES L. Stems slender, 6–10 dm. high, smoothish, or finely pubescent above; *lower leaves* long-petioled, *cordate-ovate; the upper ovate-lanceolate*, short-petioled to sessile, irregularly serrate-dentate, *hispidulous beneath; flowers* nodding, single in the axils of bracts, *forming racemes;* calyx and capsule scabrous-puberulent; *corolla campanulate*, 2–3 cm. long; *capsule opening by pores at base.* — Roadsides, thickets, etc., e. Que. to Ont., O., and s. N. Y. July, Aug. (Introd. from Eurasia.) Var. UCRÁNICA (Bess.) C. Koch. Smoother; the calyx and capsule essentially glabrous. — Similar situations, Que. and N. E. (Introd. from Russia.)

4. C. americàna L. (TALL B.) *Annual;* stem mostly simple, 0.5–1.8 m. high; leaves ovate and ovate-lanceolate, taper-pointed, serrate, mostly on margined petioles, thin, somewhat hairy, 0.5–1.5 dm. long; spiciform raceme 3–6 dm. long, the flowers solitary or clustered in the axils of the upper leaves and bracts; *corolla rotate*, light blue, 2.5 cm. broad; *capsule* glabrous, *opening by pores at the summit.* — Moist rich soil, Ont. and N. Y. to Neb., s. to Ga. and Ark. June–Aug.

5. C. rotundifòlia L. (HAREBELL, BLUEBELL.) *Slender perennial*, simple to freely branched, 1–5 dm. high, 1–15-flowered; *basal leaves* (rarely present on the flowering stems) *round-heart-shaped to ovate*, mostly toothed, *long-petioled*, early withering; *stem-leaves numerous, linear or narrowly lanceolate, smooth;* calyx-lobes awl-shaped, from $\frac{1}{3}$–$\frac{2}{3}$ the length of the purplish-blue corolla (1.5–2.5 cm. long); *capsule* nodding, short-ovoid to subcylindric, *opening by pores at base.* — Open or rocky banks, meadows, shores, etc., widely distributed in boreal regions, extending south in our range to N. J., the Great L. region, and Neb. (Eurasia.) — Extremely variable in stature, degree of branching, number and size of flowers, texture of foliage, divergence of calyx-lobes, etc., characters which seem to respond readily to slight changes of environment. Typical *C. rotundifolia* of Eurasia, with the stems closely puberulent all over at base, is comparatively scarce in eastern America, but becomes common westw. With us it passes to a commoner form (*C. intercedens* Witasek) in which the stems are glabrous or have the hairs confined to lines at the base of the stem. This in exposed situations becomes dwarfed and rigid (var. *arctica* Man. ed. 6, and perhaps Lange; var. *Langsdorfiana* Britton; *C. dubia* A. DC.). In shade the leaves are thin and elongate, in exposed situations firmer and shorter, characters upon which other artificial separations are sometimes made.

Var. velùtina DC. Stems and leaves canescent with close pubescence. — Sand hills of Burt Lake, Mich. (*E. J. Hill*). (Eu.)

6. C. PÁTULA L. *Erect* slender *annual or biennial*, simple or with long ascending branches; *stems retrorse-scabrous on the angles*, in age smoothish; *basal leaves spatulate or obovate*, the cauline lanceolate to linear and sessile, entire or crenate, *the nerves beneath* and often the margins *retrorse-scabrous;* flowers long-peduncled; calyx-lobes linear-lanceolate; *corolla 2–3 cm. long, purplish; capsule* obconic, *opening by pores at summit.* — Locally in fields, Ct. (Adv. from Eu.)

7. C. aparinoìdes Pursh. (MARSH B.) *Stem* simple or branched, *weak*, 2–6 dm. long, *somewhat 3-angled, rough backward on the angles, as are the* slightly toothed *edges and midrib of the lanceolate or linear-lanceolate soft leaves; flowers* chiefly *terminating strongly divergent leafy branches;* lobes of

the calyx triangular, half the length of the bell-shaped *nearly white corolla* (5–8 *mm. long*); capsule erect. — Wet grassy ground, Me. to Neb., s. to Ga., Ky., and Ill. June–Aug. — With the habit of a *Galium*.

8. **C. uliginòsa** Rydb. *Stiffer; leaves linear or elongate-lanceolate;* flowers chiefly borne on simple naked *erect or ascending leafless peduncles* (2.5–5.5 cm. long); *corolla bluish*, 10–12 *mm. long.* — Meadows and wet shores, N. B. to N. Y., Ia., and Sask. July, Aug.

9. **C. divaricàta** Michx. Very smooth; stem loosely branched, 3–9 dm. high; *leaves oblong-lanceolate*, pointed at both ends, *coarsely and sharply toothed; flowers numerous* in a large compound panicle; *calyx-lobes awl-shaped*, about half the length of the small pale blue corolla (6–8 mm. long); style exserted. — Dry woods and rocks, mts. of Va. to Ky., and southw.

3. JASIÒNE L. Sheep's-bit

Calyx 5-lobed. Corolla with 5 very narrow lobes. Anthers united at base into a ring about the style. Capsule opening by 2 valves. — Herbs with small flowers in involucrate heads. (Name used by Theophrastus, perhaps for *Convolvulus sepium.*)

1. **J. montàna** L. Annual or biennial, 2–5 dm. high, simple or branching; leaves linear or lanceolate; flowers blue, in heads 1–2 cm. broad. — Fields and roadsides, especially about Newport, R. I.; also sparingly elsewhere, from Mass. to N. Y. (Nat. from Eu.)

LOBELIÀCEAE (Lobelia Family)

Herbs, with acrid milky juice, alternate leaves, and scattered flowers, an irregular gamopetalous 5-lobed corolla, the 5 stamens free from the corolla and united into a tube commonly by their filaments and always by their anthers. Calyx-tube adherent to the many-seeded pod. Style 1; stigma often fringed. Seeds anatropous, with a small straight embryo, in copious albumen. — Often united with the preceding family.

1. LOBÈLIA [Plumier] L.

Calyx 5-cleft, with a short tube. Corolla with a straight tube split down on the (apparently) upper side, somewhat 2-lipped; the upper lip of 2 rather erect lobes, the lower lip spreading and 3-cleft. Two of the anthers in our species bearded at the top. Pod 2-celled, many-seeded, opening at the top. — Flowers axillary or chiefly in bracted racemes; in summer and early autumn. (Dedicated to *Matthias de l'Obel*, an early Flemish herbalist.)

* *Flowers deep red, large; stem simple.*

1. **L. cardinàlis** L. (Cardinal-flower.) Tall (0.5–1.3 m. high), perennial by offsets, smoothish; leaves oblong-lanceolate, slightly toothed; raceme elongated, rather 1-sided, the pedicels much shorter than the leaf-like bracts; the large corolla intensely red, rarely rose-color or white. — Low grounds, s. N. B. to Ont., and southw. — Hybrids with the next species occur.

* * *Flowers blue, or blue variegated with white.*

— *Flowers rather large (corolla-tube 1–1.3 cm. long), spicate-racemose; stems leafy, 0.3–1 m. high; perennial.*

— — *Leaves ovate to lanceolate, numerous; lip of corolla glabrous.*

2. **L. siphilítica** L. (Great Lobelia.) *Somewhat hairy; leaves thin, acute at both ends*, 0.5–1.5 dm. long, irregularly serrate; flowers nearly 2.5 cm. long, pediceled, longer than the leafy bracts; corolla light blue, rarely white; calyx hirsute, the *sinuses with conspicuous deflexed auricles*, the short *tube hemispherical.* — Low grounds, Me. to Ont., westw. and southw.; rare eastw.

3. **L. pubérula** Michx. *Finely soft-pubescent; leaves thickish, obtuse*, 2.5–5 cm. long, with small glandular teeth; spike rather 1-sided; bracts ovate; *sinuses of the calyx with short and rounded or often inconspicuous auricles, the hairy tube top-shaped;* corolla bright blue, 1.5–2 cm. long.—Moist sandy grounds, N. J. to Ia., s. to Tex. and Fla.

4. **L. amoèna** Michx. *Glabrous* or nearly so; raceme virgate; leaves narrower; bracts lanceolate or linear, often glandular-denticulate; calyx-lobes long and very slender, usually without auricles, the tube glabrous.—South Atlantic States, in swamps. Var. GLANDULÍFERA Gray. A slender form with secund raceme, oval to lance-oblong obtuse gland-toothed leaves, and the bracts and calyx-teeth beset with slender gland-tipped teeth.—Del., and southw.

++ ++ *Leaves long and narrow, sparse above; lip of corolla pubescent at base.*

5. **L. glandulòsa** Walt. Glabrous or sparingly pubescent; leaves, bracts, and usually the lobes of the calyx strongly glandular-toothed; calyx-tube densely hispid, rarely sparsely so or smoothish, the sinuses not auriculate.—Pine barren swamps, s. Va. to Fla.

+– +– *Flowers smaller (corolla-tube not more than 4–8 mm. long).*

+– *Stem leafy, mostly simple, continued into an elongated virgate spike-like raceme; leaves lanceolate to obovate, barely denticulate or repand.*

6. **L. leptóstachys** A. DC. Smooth above; leaves obtuse, thick, denticulate, oblong-lanceolate, the upper gradually reduced to awl-shaped bracts; calyx-lobes nearly equaling the corolla, with 10 *reflexed awl-shaped appendages as long as the hemispherical tube.*—Sandy soil, O. to Kan.; also Va. to Ga.; rarely adventive in the Northeast.

7. **L. spicàta** Lam. Stem slender, *strict*, 0.3–1 m. high, minutely pubescent below, as are the barely denticulate leaves; lower leaves obovate or spatulate, the upper reduced to linear or club-shaped bracts; calyx-tube short, obconical or becoming almost hemispherical, *sinuses not appendaged.*—Moist or dry mostly gravelly or sandy soil, P. E. I. to Ont., westw. and southw. Var. PARVIFLÒRA Gray. A small form, with calyx-lobes broadly subulate, and pale corolla but 6 mm. long.—Swamps, Lancaster, Pa. (*Porter*). Var. HIRTÉLLA Gray. With somewhat scabrous pubescence, and minutely hirsute-ciliate bracts and calyx-lobes.—Ill., Mich., and northwestw.

+– +– *Stem leafy, often paniculately branched; flowers loosely racemose; sinuses of calyx not appendaged; annual or biennial.*

= *Leaves chiefly linear, entire or denticulate; pod not inflated.*

8. **L. Cánbyi** Gray. Stem strict, 3–9 dm. high, minutely angled; *pedicels shorter than the bracts and flowers*, minutely roughened under a lens; *bractlets none; calyx-tube top-shaped, acute at base, only half the length of the lobes* (which, with the linear leaves, are sparsely glandular-denticulate), in fruit becoming ellipsoid, covering the whole pod; corolla deep blue, fully 1 cm. long, more or less *bearded in the throat.*—Wet places, N. J., Del., and S. C.

9. **L. Kálmii** L. Stem mostly low (1–5 dm. high), minutely angled; *pedicels filiform, not exceeding* the linear or setaceous *bracts, but as long as the flower, minutely 2-bracteolate or 2-glandular above the middle; calyx-tube top-shaped or obovoid*, fully half the length of the lobes, in fruit rather longer than they, covering the whole pod; corolla light blue, 1 cm. long.—Wet limestone shores and bogs, Nfd. to N. J., w. to n. Ia., Minn., and Man.

10. **L. Nuttállii** R. & S. Stem very slender, 3–9 dm. high, terete; *pedicels mostly longer than the bracts and shorter than the flowers*, usually with very minute bractlets near the base; *calyx-tube very short, depressed-hemispherical in fruit*, the globular pod half free; corolla pale blue, 5–8 mm. long.—Sandy swamps, L. I., N. J., and Pa. to Ga.

= = *Leaves ovate or oblong, obtusely toothed; pod inflated, wholly inferior.*

11. **L. inflàta** L. (INDIAN TOBACCO.) Stems paniculately much branched from an annual root, pubescent with spreading hairs, 3–8 dm. high; leaves

gradually diminishing into leaf-like bracts, which exceed the lower short-pediceled flowers; calyx-tube ovoid; corolla only 3–4 mm. long. — Dry open fields and thickets. — Plant poisonous and a noted quack medicine.

↔ ↔ ↔ *Stem scape-like, mostly simple, hollow; leaves fleshy; fibrous-rooted perennials, very glabrous, mostly aquatic, with pale blue or whitish flowers.*

12. **L. paludòsa** Nutt. Nearly smooth; stem slender, 0.3–1.2 m. high; *leaves flat, scattered near the base, linear-spatulate* or oblong-linear, glandular-denticulate, mostly tapering into a petiole; lower lip of corolla bearded in the middle; calyx-tube about half the length of the short lobes, hemispherical in fruit. — In water (but foliage emerging), Del. to Fla. and La.

13. **L. Dortmánna** L. (WATER LOBELIA.) Very smooth; *scape thickish*, 1–5 (or in deep water even 9) dm. high, *few-flowered; leaves all tufted at the base, linear, terete, hollow*, with a partition lengthwise; lower lip of corolla slightly hairy; calyx-tube about as long as the lobes, in fruit much longer. — Borders of ponds (often immersed), Nfd. to N. J., Pa., and northwestw. (Eu.)

COMPÓSITAE (COMPOSITE FAMILY)

Flowers in a close head (the compound flower of the older botanists), *on a common receptacle, surrounded by an involucre, with* 5 (*rarely* 4) *stamens inserted on the corolla, their anthers united in a tube* (*syngenesious*). Calyx-tube united with the 1-celled ovary, the limb (called a *pappus*) crowning its summit in the form of bristles, awns, scales, teeth, etc., or cup-shaped, or else entirely absent. Corolla either strap-shaped or tubular; in the latter chiefly 5-lobed, valvate in the bud, the veins bordering the margins of the lobes. Style 2-cleft at the apex (in sterile flowers usually entire). Fruit seed-like (*achene*), dry, containing a single erect anatropous seed, with no albumen. — An immense family, in temperate regions chiefly herbs, without stipules, with perfect, polygamous, monoecious, or dioecious flowers. The flowers with a strap-shaped (*ligulate*) corolla are called *rays* or *ray-flowers;* the head which presents such flowers, either throughout or at the margin, is *radiate*. The tubular flowers compose the *disk;* and a head which has no ray-flowers is said to be *discoid*. When the head contains two sorts of flowers it is said to be *heterogamous;* when only one sort, *homogamous*. The leaves of the involucre, of whatever form or texture, are termed *bracts*. The bracts or scales, which often grow on the receptacle among the flowers, are called the *chaff;* when these are wanting, the receptacle is said to be *naked*. The largest family of phaenogamous plants. The genera are divided by the corolla into three series, only two of which are represented in our region. The first is much the larger.

SERIES I. TUBULIFLÒRAE

Corolla tubular in all the perfect flowers, regularly 5(rarely 3–4)-lobed, ligulate only in the marginal or ray-flowers, which when present are either pistillate only, or neutral (with neither stamens nor pistil).

Tribe I. VERNONÌEAE. Heads discoid; the flowers all alike, perfect and tubular, never yellow. Branches of the style long and slender, terete, thread-shaped, minutely bristly-hairy all over. Leaves alternate or scattered.

1. **Vernonia.** Heads several-many-flowered, separate. Involucre of many bracts. Pappus double, the inner capillary, the outer of minute chaffy bristles.
2. **Elephantopus.** Heads 2–5-flowered, several crowded together into a compound head. Involucre of 8 bracts. Pappus of several chaffy bristles.

Tribe II. EUPATORÌEAE. Heads discoid; the flowers all alike, perfect and tubular, never yellow. Branches of the style thickened upward or club-shaped, obtuse, very minutely and uniformly pubescent; the stigmatic lines indistinct.

* Pappus a row of hard oval obtuse scales.

3. **Sclerolepis.** Head many-flowered. Bracts of the involucre equal. Leaves whorled.

* * Pappus of slender bristles.

+ Achene 5-angled; bristles of the pappus roughish.

4. **Eupatorium.** Involucre of more than 4 bracts and the flowers few or many. Stems not twining.
5. **Mikania.** Flowers and involucral bracts only 4. Stems twining.

+ + Achene 10-ribbed; involucral bracts striate-nerved.

6. **Trilisa** Pappus minutely barbellate. Corolla rose-purple. Heads corymbed or panicled, the involucre little imbricated.
7. **Brickellia.** Involucral bracts in several series. Pappus merely scabrous.
8. **Kuhnia.** Pappus very strongly plumose. Bracts of the involucre few.
9. **Liatris.** Pappus plumose or only barbellate. Corolla red-purple, strongly 5-lobed. Heads spicate or racemose, the involucre well imbricated.

Tribe III. ASTÈREAE. Heads discoid, the flowers all alike and tubular; or else radiate, the outer ones ligulate and pistillate. Anthers not caudate at base. Branches of the style in the perfect flowers flat, smooth up to where the conspicuous marginal stigmatic lines abruptly terminate, and prolonged above this into a flattened lance-shaped or triangular appendage which is evenly hairy all around or pubescent outside. Leaves alternate. Receptacle naked (destitute of chaff) in all our species.

* Ray-flowers yellow (in one species of no. 15 whitish), or sometimes none at all.

+ Pappus of not numerous slender bristles; heads radiate; involucre of firm bracts with greenish tips, commonly coated with resin.

10. **Grindelia.** Heads large, many-flowered. Flowers all fertile. Pappus of 2–8 rigid caducous awns. Coarse herbs with toothed leaves.
11. **Gutierrezia.** Heads small, numerous. Ray-and disk-flowers 3 or 4 each, all fertile. Pappus of several short chaffy scales. Suffrutescent; leaves very narrow.
12. **Amphiachyris.** Heads small. Ray-flowers 5–10; pappus coroniform. Disk-flowers infertile; pappus of several bristle-like scales. Annual; leaves very narrow.

+ + Pappus (at least of the disk) of copious slender or capillary bristles.

++ Pappus double.

13. **Heterotheca.** Resembling *Chrysopsis*, but the achenes of the ray thicker than those of the disk and without pappus or nearly so. Western.
14. **Chrysopsis.** Heads many-flowered; rays numerous. The outer pappus of very small chaffy bristles, much shorter than the inner of copious capillary bristles.

++ ++ Pappus simple.

15. **Solidago.** Heads few-many-flowered; rays 1–16. Pappus of numerous slender and equal capillary bristles.
16. **Brachychaeta.** Heads 8–10-flowered, clustered; rays 4 or 5. Pappus a row of minute bristles, shorter than the achene.
17. **Aplopappus.** Heads many-flowered, many-radiate. Involucre hemispherical. Pappus of many unequal bristles. Western.
18. **Bigelowia.** Heads 3–4-flowered; rays none. Receptacle awl-shaped. Pappus a single row of capillary bristles.

* * Ray-flowers white, blue, pink, or purple, scarcely ever yellow.

+ Pappus none or very short, with or without a few awns.

++ Receptacle conical; awns none.

19. **Bellis.** Achenes marginless, flattened; pappus none. Involucral bracts equal.

++ ++ Receptacle flat or convex; pappus usually with awns.

20. **Chaetopappa.** Achenes fusiform; pappus of 5 or fewer thin chaffy scales and often alternating awns. Western.

21. **Boltonia.** Achenes very flat, thick-winged; pappus of short bristles and usually 2–4 awns.

+ + Pappus of numerous long and capillary bristles; receptacle flat.

22. **Aster.** Heads many-flowered, on leafy peduncles. Involucral bracts mostly unequal, loosely or closely imbricated. Achenes flattish; pappus simple (rarely double), copious.

23. **Erigeron.** Heads many-flowered, on naked peduncles. Involucre of narrow equal bracts, little imbricated. Achenes flattened; pappus simple and rather scanty, or with some outer minute scales.

24. **Sericocarpus.** Heads 12–20-flowered; rays 4 or 5. Involucre subcylindric or club-shaped, imbricated, cartilaginous. Achenes short, narrowed downward, silky.

* * * Rays none; heads dioecious (all pistillate or all staminate).

25. **Baccharis.** Heads many-flowered. Pappus capillary. Smooth glutinous shrubs.

Tribe IV. INÙLEAE. Heads discoid (radiate only in *Inula*), the pistillate flowers mostly filiform and truncate. Anthers sagittate, the basal lobes attenuate into tails. Style-branches with unappendaged obtuse or truncate naked tips. Pappus capillary or none.

* Receptacle flat, naked; involucre not scarious, imbricated; not woolly.

26. **Pluchea.** Heads containing a few perfect but sterile flowers in the center, and many pistillate fertile ones around them. Pappus capillary.

* * Receptacle chaffy; involucral bracts few, mostly scarious; low floccose-woolly annuals; flowers as in no. 26.

27. **Gifola.** Receptacle subulate. Achenes terete. Outer flowers without pappus.

* * * Receptacle naked; involucral bracts many, scarious; floccose-woolly herbs.

28. **Antennaria.** Heads dioecious. Pappus of sterile flowers club-shaped or barbellate, of the fertile capillary, united at base and deciduous together.

29. **Anaphalis.** Heads dioecious or nearly so. Pappus not thickened above nor at all united at base.

30. **Gnaphalium.** Heads all fertile throughout. Pappus all capillary.

* * * * Heads radiate; receptacle naked; involucre herbaceous; pappus copious.

31. **Inula.** Heads large, many-flowered. Flowers yellow. Stout perennial.

* * * * * Corollas all somewhat broadly tubular and lobed; involucre not scarious; receptacle naked; pappus none.

32. **Adenocaulon.** Heads few-flowered and bracts few; outer flowers pistillate. Somewhat woolly.

Tribe V. HELIÂNTHEAE. Heads radiate or discoid. Involucre not scarious (nut-like in fruit in nos. 40, 41, and 42). Receptacle chaffy. Pappus never capillary, sometimes none. Anthers not caudate. Style-branches truncate or hairy-appendaged.

* Ray-flowers fertile and ligulate (sometimes obscurely so); disk-flowers sterile.

+ Achenes thickish, not strongly flattened either way.

33. **Polymnia.** Achenes partially enveloped by the inner bracts of the involucre, these unarmed. Perennials.

34. **Acanthospermum.** Achenes closely invested by the glochidiate or prickly inner involucral bracts. Annuals.

+ + Achenes strongly flattened parallel to the bracts of the involucre, *i.e.* obcompressed.

35. **Silphium.** Achenes wing-margined, in several rows; pappus none or of 2 teeth. Bracts of the involucre thick, in several rows.

36. **Berlandiera.** Achenes wingless, 5–12 in one row, without pappus. Involucral bracts thin, obovate, the outer smaller and more foliaceous.

37. **Chrysogonum.** Achenes wingless, about 5; pappus a one-sided 2–3-toothed crown. Inner bracts 5, chaff-like, the outer 5 longer and leaf-like.

38. **Parthenium.** Rays 5, very short, persistent. Pappus of 2 small chaffy scales. Involucral bracts short, roundish, in 2 rows.

* * None of the flowers ligulate, the fertile few (1–5), with minute tubular corolla or none.

+ Heads alike.

39. **Iva.** Achenes short, thick. Involucre of few roundish bracts.

+ + Heads of two kinds, the fertile with a tuberculate or bur-like involucro.

40. **Ambrosia.** Bracts of staminate involucro united; fertile involucre with a single row of tubercles near the summit. Fruiting head 1-seeded.

41. **Franseria.** Staminate involucre as in no. 40; fertile involucre with more than 1 row of tubercles or prickles. Fruiting head 2–4-seeded.

42. **Xanthium.** Bracts of the staminate involucre distinct. Fruiting head 1–4-celled, 1–4-beaked.

* * * Disk-flowers fertile, their corollas funnel-form; anthers blackish; pappus none, or a crown or cup, or of 1–2 chaffy awns, neither capillary, nor of several uniform chaffy scales; leaves more commonly opposite.

+ Rays persistent upon the mature achenes.

43. **Heliopsis.** Ray-flowers fertile. Achenes 4-sided. Leaves opposite.

+ + Rays deciduous or absent.

++ Chaff of the flat receptacle bristle-shaped.

44. **Eclipta.** Rays short. Involucral bracts 10–12, in two rows, herbaceous.

++ ++ Chaff scale-like, embracing or subtending the achenes.

= Involucre double; the outer forming an angled cup.

45. **Tetragonotheca.** Outer involucre 4-leaved. Achenes obovoid; pappus none.

= = Involucre of one or more rows of separate bracts.

a. Receptacle high, conical or columnar in fruit; pappus none or a short crown or awn.

46. **Rudbeckia.** Rays neutral. Achenes 4-sided or terete, flat at the top, marginless.

47. **Brauneria.** Rays rose-colored (rarely yellow), pistillate, sterile. Achenes short, 4-sided. Chaff spinescent.

48. **Lepachys.** Rays few, neutral. Achenes flattened laterally and margined.

49. **Spilanthes.** Rays yellow or white and fertile, or none. Ray-achenes 3-sided or obcompressed.

b. Receptacle flat to convex; achenes not winged nor very flat.

50. **Borrichia.** Achenes 3–4-angled; pappus a short 4-toothed crown. Shrubby.

51. **Helianthus.** Achenes flattened, bearing 2 very deciduous chaffy pointed scales and rarely minute intermediate ones.

c. Receptacle convex (rarely conical); achenes flat, compressed laterally, winged or wingless 2–3-awned; leaves decurrent.

52. **Actinomeris.** Bracts few, soon deflexed. Achenes obovate, squarrosely spreading.

53. **Verbesina.** Involucral bracts closely imbricated in 2 or more rows.

* * * * Rays few and neutral, or wanting; achenes obcompressed, *i.e.* flattened parallel with the scales of the involucre (rarely terete); involucre double; the outer spreading and often foliaceous; receptacle flat; leaves opposite.

54. **Coreopsis.** Involucral bracts distinct or united only at base. Pappus of 2 (or rarely more) scales, teeth, or awns, which are naked, not barbed, sometimes obsolete or a mere crown.

55. **Thelesperma.** Inner involucre connate to the middle. Achenes terete. Awns 2, retrorsely hispid.

56. **Bidens.** Involucral bracts distinct or united merely at base. Pappus of 2 or more rigid and persistent barbed awns or teeth.

* * * * * Heads radiate or discoid; disk-flowers all perfect and fertile, achenes turbinate, 5-angled; pappus of several chaffy scales.

+ Leaves alternate, entire; disk-flowers purplish.

57. **Balduina.** Rays numerous, long, neutral. Involucre much imbricated. Receptacle deeply honeycombed.

58. **Marshallia.** Rays none. Involucre of narrow leafy equal bracts. Receptacle chaffy.

+ + Leaves opposite, serrate; disk-flowers yellow.

59. **Galinsoga.** Rays few, short, pistillate, whitish. Involucre of 4–5 thin ovate bracts. Receptacle chaffy.

Tribe VI. HELEÌNEAE. Nearly as Tribe V., but receptacle not chaffy (somewhat so in nos. 65 and 66). In our genera, the disk-flowers perfect and fertile; the pappus a row of several chaffy

scales (bristly-dissected in no. 66); the involucre hardly at all imbricated (partly scarious in no. 61).

* Involucral bracts distinct, not glandular-punctate.

+ Pappus none; bracts 2–5, carinate.

60. **Flaveria.** Heads small. Ray single or none.

+ + Pappus of distinct scales or bristles or wanting; bracts more than 5.

++ Tips of bracts colored or petaloid.

61. **Hymenopappus.** Lower leaves pinnatifid. Rays none. Disk-flowers with ovate lobes.
62. **Polypteris.** Leaves undivided. Rays generally none. Disk-flowers with linear lobes.

++ ++ Tips of bract not colored and petaloid.

63. **Actinea.** Rays fertile, 3-toothed. Receptacle elevated. Involucral bracts appressed.
64. **Helenium.** Rays fertile or sterile, 3–5-cleft. Receptacle elevated. Involucre small, reflexed. Leaves decurrent.
65. **Gaillardia.** Rays 3-toothed, or none. Receptacle usually beset with fine fimbrillate chaff. Outer involucral bracts loose and leafy. Pappus-chaff tipped with the projecting mid-vein. Western.

* * Dotted with oil-glands; involucral bracts united into a cup.

66. **Dyssodia.** Pappus a row of chaffy scales dissected into many bristles.

Tribe VII. ANTHEMÍDEAE. Distinguished from the last two tribes by the more or less dry and scarious imbricated bracts of the involucre. Heads radiate (rays mostly white) or discoid, the perfect flowers sometimes sterile and the pistillate rarely tubular. Achenes small; pappus a short crown or none. Mostly strong-scented; leaves alternate.

* Receptacle chaffy, at least in part; heads radiate, many-flowered.

67. **Achillea.** Receptacle flattish. Achenes obcompressed. Heads small, campanulate or obovoid.
68. **Anthemis.** Achenes subterete, angled or ribbed. Heads hemispherical, rather large.

* * Receptacle naked.

+ Heads solitary or corymbose.

++ Receptacle conical at least in age.

69. **Matricaria.** Heads pedunculate. Rays pistillate or none. Pappus crown-like or none. Leaves finely dissected.

++ ++ Receptacle flattish or moderately convex.

= Corollas of the perfect flowers 5-toothed; achenes sessile.

70. **Chrysanthemum.** Heads radiate (or rayless in one variety with leaves almost or quite unlobed); rays pistillate. Achenes 5–10-nerved; pappus none.
71. **Tanacetum.** Heads discoid. Pistillate flowers few, marginal, their corollas inconspicuous, 2–3-toothed. Achenes 3–5-angled; pappus none or a short crown.

= = Corollas of the perfect flowers 4-toothed; achenes stalked.

72. **Cotula.** Heads long-pedunculed, discoid. Pistillate flowers destitute of corolla. Achenes raised upon papillae which persist upon the receptacle.

+ + Inflorescence from spike-like to chiefly racemose-paniculate.

73. **Artemisia.** Heads small, usually drooping, discoid. Pappus none.

Tribe VIII. SENECIÒNEAE. Heads radiate or discoid, the involucre little or not at all imbricated, not scarious. Receptacle naked. Anthers tailless. Pappus capillary.

* Heads monoecious or subdioecious, the perfect flowers mostly sterile, and the small (ligulate or tubular) ray-flowers in more than one row (at least in the fertile heads); style-branches obtuse, not appendaged nor hispid; leaves chiefly radical.

74. **Tussilago.** Head solitary, yellow-flowered, monoecious.
75. **Petasites.** Heads corymbed, subdioecious. Flowers white or purplish.

* * Flowers all fertile; style-branches truncate or capitellate, often appendaged; involucral bracts connivent-erect.

+ Leaves opposite.

76. **Arnica.** Heads showy. Pappus rather rigid, scabrous or barbellate.

+ + Leaves alternate; pappus soft-capillary, copious.

77. **Erechtites.** Heads discoid. Flowers whitish, the outer pistillate with filiform corollas.
78. **Cacalia.** Heads discoid. Corollas white or cream-colored, 5-cleft.
79. **Senecio.** Heads usually radiate. Corollas yellow, 5-toothed.

Tribe IX. CYNÀREAE. Flowers all tubular and perfect (the outer ray-like and neutral in nos. 86 and 87). Involucre much imbricated. Anthers caudate, long-appendaged at tip. Style-branches short or united, obtuse, unappendaged, smooth, with often a pubescent ring below. Pappus mostly bristly. Leaves alternate.

* Achenes attached by the base; flowers all alike.

+ Leaves not prickly; style-branches partly distinct; filaments glabrous.

80. **Arctium.** Involucral bracts hooked at the tip. Pappus of short rough bristles.

+ + Leaves prickly; style-branches coherent, usually a pubescent ring below.

++ Involucres 1-flowered, aggregated into dense globose heads.

81. **Echinops.** General involucre small, reflexed, and hidden. Coarse thistle-like herbs, with large globular (compound) heads of pale flowers.

++ ++ Involucres many-flowered.

= Filaments papillose-pilose, free.

a. Receptacle densely bristly.

82. **Carduus.** Pappus-bristles not plumose.
83. **Cirsium.** Pappus-bristles plumose.

b. Receptacle deeply honeycombed, scarcely or not at all bristly.

84. **Onopordum.** Pappus-bristles not plumose.

= = Filaments glabrous, united into a tube.

85. **Silybum.** Involucral bracts ending in a long stout spinescent appendage, spreading or reflexed. Receptacle densely bristly. Pappus-bristles not plumose. Stout thistle-like herbs, with large heads.

* * Achenes obliquely attached; marginal flowers often enlarged and ray-like.

86. **Centaurea.** Pappus of several series of short scales or bristles or none. Flowers red, purple, blue, white, or rarely yellow.
87. **Cnicus.** Pappus of 10 short horny teeth, 10 long bristles, and 10 shorter ones. Flowers yellow.

SERIES II. LIGULIFLÒRAE

Corolla ligulate in all the flowers of the head, and all the flowers perfect Herbs, with milky juice. Leaves alternate.

Tribe X. CICHORÌEAE. Characters of the series.

* Pappus none; annuals.

+ Leafy-stemmed.

88. **Lapsana.** Involucre cylindrical, calyculate-bracteate at base.
89. **Serinia.** Involucre not calyculate.

+ + Leaves all basal.

90. **Arnoseris.** Involucral bracts narrow, at length carinate-thickened.

* * Pappus chaffy, or of both chaff and bristles.

91. **Cichorium.** Involucre double. Pappus a small crown of many bristle-form scales.
92. **Krigia.** Involucre simple, not calyculate. Pappus of both chaff and bristles.

* * * Pappus plumose.

93. **Hypochaeris.** Involucre calyculate. Achenes fusiform, the inner produced into long slender beaks. Leaves radical.
94. **Leontodon.** Similar. Achenes uniform.
95. **Picris** Outer involucral bracts spreading. Achenes terete, not beaked. Stems leafy.
96. **Tragopogon.** Involucre simple, not calyculate. Achenes long-beaked. Stems leafy.

* * * * Pappus composed entirely of capillary bristles, not plumose.

+ Achenes strongly muricate or spinulose above.

97. **Chondrilla.** Stem branching, leafy. Involucre few-flowered, calyculate. Achenes terete, several-ribbed.

98. **Taraxacum.** Scapose. Involucre calyculate, many-flowered. Achenes fusiform, 4–5-ribbed.

+ + Achenes not muricate above.

++ Achenes flat or flattish. Pappus white, fine and soft. Involucre imbricated. Leafy-stemmed, with panicled heads.

99. **Sonchus.** Achenes flattish, not at all beaked. Flowers 50 or more in each head, yellow.

100. **Lactuca.** Achenes usually more or less beaked. Flowers 6–30 in each head, yellow, blue, or purple.

++ ++ Achenes columnar, often slender.

= Achenes not conspicuously narrowed at base. Flowers rose or purple.

101. **Lygodesmia.** Achenes long, slightly tapering above. Pappus white. Stems nearly leafless; Head erect. Western.

= = Achenes narrowed at base.

a. Achenes beaked (sometimes beakless in no. 102); flowers yellow.

102. **Agoseris.** Scapose. Involucre loosely imbricated. Achenes 10-ribbed.

103. **Pyrrhopappus.** Scapose or branched. Achenes 4–5-ribbed.

b. Achenes not beaked.

1. Involucral bracts in a single row.

104. **Crepis.** Pappus white, soft. Flowers yellow or orange.

2. Bracts in more than one row.

105. **Prenanthes.** Involucre calyculate. Achenes short, blunt. Pappus whitish, tawny, or brown. Flowers white, cream-color, or pinkish.

106. **Hieracium.** Involucre imbricated. Pappus tawny. Flowers yellow or orange.

Artificial Key to Genera

Series I. Disk-flowers with tubular regular corollas; ligulate flowers if present marginal.

§ 1. *Rays or ligulate flowers none; corollas all tubular (or rarely none).*

* **Flowers of the head all perfect and alike** *a.*

a. Pappus composed of bristles *b.*
  b. Pappus double, the outer of very short, the inner of longer bristles . 1. *Vernonia.*
  b. Pappus simple, the bristles all of the same sort *c.*
    c. Heads few-flowered, themselves aggregated into compound or dense clusters . . . . . 2. *Elephantopus.*
    c. Heads separate *d.*
      d. Receptacle (when the flowers are pulled off) bristly-hairy.
        Leaves not prickly . . . . . 80. *Arctium.*
        Leaves prickly.
          Filaments glabrous, united into a tube . . . . . 85. *Silybum.*
          Filaments papillose-pilose, separate.
            Pappus-bristles not plumose . . . . . 82. *Carduus.*
            Pappus-bristles plumose . . . . . 83. *Cirsium.*
      d. Receptacle deeply honeycomb-like . . . . . 84. *Onopordum.*
      d. Receptacle naked.
        Pappus-bristles plumose.
          Corollas rose-color or purple; heads racemose or spicate . 9. *Liatris.*
          Corollas whitish; heads corymbose . . . . . 8. *Kuhnia.*
        Pappus-bristles sometimes roughened but not plumose.
          Stem twining; leaves opposite, triangular-hastate . . 5. *Mikania.*
          Stem not twining.
            Achenes 5-angled, 5-ribbed . . . . . 4. *Eupatorium.*
            Achenes 8–10-ribbed or without definite angles or ribs.
              Annual . . . . . 77. *Erechtites.*
              Perennial.
                Flowers yellow.
                  Involucral bracts much imbricated in several series . 18. *Bigelowia.*
                  Involucre simple or merely calyculate . . . 79. *Senecio.*

Flowers purple . . . . . 6. *Trillisa.*
Flowers whitish.
Involucral bracts much imbricated; leaves chiefly opposite . . . . . 7. *Brickellia*
Involucral bracts little imbricated; leaves alternate . 78. *Cacalia.*
d. Pappus not composed of bristles *e.*
e. Pappus none or a mere crown-like margin to the fruit.
Heads 1-flowered, themselves aggregated into globose glomerules; leaves prickly . . . . . 81. *Echinops.*
Heads many-flowered; leaves not prickly.
Outer involucre foliaceous; leaves opposite at least below . . 33. *Polymnia.*
Outer involucre not foliaceous; leaves alternate.
Receptacle conical, becoming elongated . . . . . 69. *Matricaria.*
Receptacle flattish or merely convex.
Heads chiefly nodding, in spikes, racemes, or panicles . . 73. *Artemisia.*
Heads corymbose . . . . . 70. *Chrysanthemum.*
e. Pappus present *f.*
f. Pappus composed of scales or chaff.
Receptacle naked.
Leaves in whorls . . . . . 8. *Sclerolepis.*
Leaves alternate.
Leaves dissected . . . . . 61. *Hymenopappus.*
Leaves entire . . . . . 62. *Polypteris.*
Receptacle bearing chaff among the flowers.
Leaves toothed or lobed . . . . . 65. *Gaillardia.*
Leaves entire . . . . . 58. *Marshallia.*
f. Pappus of 2–several teeth or awns.
Pappus caducous . . . . . 10. *Grindelia.*
Pappus persistent.
Achenes laterally compressed . . . . . 53. *Verbesina.*
Achenes terete or flattened parallel with the involucral bracts.
Pappus barbed.
Bracts of inner involucre connate to middle; achenes terete 55. *Thelesperma.*
Bracts of inner involucre distinct or nearly so; achenes obcompressed . . . . . 56. *Bidens.*
Pappus not barbed . . . . . 54. *Corecpsis.*

*** * Flowers of two kinds in the same head *g.***

g. Marginal flowers neutral and sterile, either conspicuous or inconspicuous.
Leaves spiny; heads subtended by foliaceous bracts . . . . . 87. *Cnicus.*
Leaves not spiny; no conspicuous foliaceous bracts . . . . . 86. *Centaurea.*
g. Marginal flowers pistillate and fertile *h.*
h. Receptacle chaffy.
Receptacle awl-shaped; achenes terete . . . . . 27. *Gifola.*
Receptacle flattish or moderately convex; achenes flattened . . 51. *Helianthus.*
h. Receptacle naked or bearing no conspicuous chaff *i.*
i. Pappus of capillary bristles *j.*
j. Involucral bracts imbricated in several rows.
Leaves toothed; not woolly . . . . . 26. *Pluchea.*
Leaves entire; plant more or less woolly.
Some flowers staminate and sterile . . . . . 29. *Anaphalis.*
All flowers fertile, either pistillate or perfect . . . . . 30. *Gnaphalium.*
j. Involucral bracts chiefly in one row.
Leaves cordate, triangular or palmately lobed . . . . . 75. *Petasites.*
Leaves not cordate.
Involucre campanulate . . . . . 23. *Erigeron.*
Involucre ovoid at base, cylindric above . . . . . 77. *Erechtites.*
i. Pappus a short crown or none.
Achenes becoming much longer than the involucre . . . . 32. *Adenocaulon*
Achenes not exceeding the involucre.
Heads corymbose, erect . . . . . 71. *Tanacetum.*
Heads solitary on long peduncles . . . . . 72. *Cotula.*
Heads racemose or paniculate, nodding.
Lower leaves opposite . . . . . 39. *Iva.*
Lower leaves alternate . . . . . 73. *Artemisia*

*** * * Staminate and pistillate flowers in separate heads *k.***

k. Pappus capillary.
Leaves prickly; heads large . . . . . 83. *Cirsium.*
Leaves not prickly; heads small.
Shrubs; leaves mostly toothed . . . . . 25. *Baccharis.*
Herbs; leaves entire.
Pappus-bristles somewhat club-shaped in sterile flowers, but capillary and slightly connate at base in the fertile . . . . 28. *Antennaria*
Pappus-bristles all capillary, not at all connate . . . . . 29. *Anaphalis.*
k. Pappus none; fertile involucre becoming bur-like.
Bracts of the staminate involucre united into a cup.
Fertile involucre armed with one ring of spines, teeth, or blunt processes . . . . . 40. *Ambrosia.*

Fertile involucre armed with 2 or more rows of spines or these irregularly distributed . . . . . 41. *Franseria.*
Bracts of staminate involucre distinct; fertile involucre horned in fruit and very prickly . . . . . 42. *Xanthium.*

§ 2. *Rays present*, i.e. *the marginal flowers or some of them with strap-like corollas.*

*** Pappus of capillary bristles, at least in the disk flowers; ray-flowers pistillate** *l.*

l. Rays occupying several rows.
Rays yellow . . . . . 74. *Tussilago.*
Rays white or purplish.
Leaves cordate . . . . . 75. *Petasites.*
Leaves not cordate . . . . . 23. *Erigeron.*
l. Rays in one marginal row *m.*
m. Rays not yellow.
Upper part of stem bearing ovate or lanceolate phyllodia . . . 75. *Petasites.*
Phyllodia none.
Rays and disk-flowers similarly colored . . . . . 15. *Solidago.*
Rays and disk-flowers of contrasting colors.
Rays 4 or 5 . . . . . 24. *Sericocarpus.*
Rays numerous.
Involucral bracts subequal, narrow, chiefly in 1 series . . 23. *Erigeron.*
Involucral bracts imbricated in several mostly unequal series 22. *Aster.*
m. Rays yellow *n.*
n. Pappus (at least in the disk-flowers) double, the outer short and minute.
Ray-flowers with pappus of capillary bristles . . . . . 14. *Chrysopsis.*
Ray-flowers with coroniform pappus . . . . . 13. *Heterotheca.*
n. Pappus simple.
Leaves opposite . . . . . 76. *Arnica.*
Leaves alternate.
Involucral bracts equal and in 1 row (though often calyculate) . 79. *Senecio.*
Involucral bracts imbricated in several series.
Heads 3–5 cm. in diameter . . . . . 31. *Inula.*
Heads 2 cm. or less in diameter.
Pappus of several very narrow scales rather than truly capillary bristles.
Pappus of disk-flowers nearly or quite as long as the corolla . . . . . 12. *Amphiachyris.*
Pappus of disk-flowers much shorter than the corolla . 11. *Gutierrezia.*
Pappus-bristles hair-like.
Pappus-bristles equal . . . . . 15. *Solidago.*
Pappus-bristles unequal . . . . . 17. *Aplopappus.*

**** Pappus a circle of awns or rigid bristles at least in the disk-flowers** . . . . . 10. *Grindelia.*

***** Pappus a circle of chaffy scales dissected into bristles** . . 66. *Dyssodia.*

****** Pappus a circle of thin chaffy scales or short chaffy bristles** *o.*

o. Receptacle deeply honeycombed . . . . . 57. *Balduina.*
o. Receptacle not deeply honeycombed, naked.
Receptacle flattish; heads small, few-flowered.
Leaves serrate, the lower heart-shaped . . . . . 16. *Brachychaeta.*
Leaves entire, linear, never cordate . . . . . 11. *Gutierrezia.*
Receptacle elevated, strongly convex; heads many-flowered.
Scapose . . . . . 63. *Actinea.*
Leafy-stemmed; leaves decurrent . . . . . 64. *Helenium.*
o. Receptacle not deeply honeycombed, chaffy.
Heads less than 1 cm. in diameter . . . . . 59. *Galinsoga.*
Heads more than 1 cm. in diameter . . . . . 65. *Gaillardia.*

******* Pappus none, or a cup or crown, or of 2 or 3 awns, teeth or chaffy scales corresponding with the edges or angles of the achene, often with intervening minute bristles or scales.**

+ Receptacle naked *p.*

p. Achenes flattened.
Achenes wing-margined; pappus present . . . . . 21. *Boltonia.*
Achenes marginless; pappus none . . . . . 19. *Bellis.*
p. Achenes terete or prismatic.
Receptacle conical . . . . . 69. *Matricaria.*
Receptacle flattish.
Heads very small; ray-flowers mostly 1 . . . . . 60. *Flaveria.*
Heads rather large; rays numerous . . . . . 70. *Chrysanthemum.*
p. Achenes fusiform; pappus of few scales, usually alternating with awns 20. *Chaetopappa.*

+ + Receptacle chaffy *q.*

q. Rays neutral (rarely pistillate but sterile); the disk-flowers perfect and fertile.

Receptacle flat or nearly so.
Achenes cylindrical, 2-awned . . . . . 55. *Thelesperma.*
Achenes flattened parallel to the chaff.
Pappus-awns barbed . . . . . 56. *Bidens.*
Pappus-awns not barbed . . . . . 54. *Coreopsis.*
Receptacle convex to columnar.
Involucral bracts with thin scarious margins . . . . . 68. *Anthemis.*
Involucral bracts distinctly herbaceous.
Pappus of 2 awns.
Pappus-awns very deciduous . . . . . 51. *Helianthus.*
Pappus-awns persistent . . . . . 52. *Actinomeris.*
Pappus none or a crown of short teeth.
Rays rose-color (rarely yellow), pistillate . . . . . 47. *Brauneria.*
Rays yellow to brownish-red or orange, neutral.
Achenes 4-sided, marginless . . . . . 46. *Rudbeckia.*
Achenes flattened and margined . . . . . 48. *Lepachys.*
q. Rays pistillate and fertile *r.*
r. Disk-flowers also fertile, their achenes maturing *s.*
s. Leaves alternate.
Pappus of 1–3 awns or teeth . . . . . 53. *Verbesina.*
Pappus none.
Heads less than 1 cm. broad; achenes obcompressed . . 67. *Achillea.*
Heads more than 1 cm. broad; achenes not compressed . 68. *Anthemis.*
s. Leaves opposite.
Maritime shrub . . . . . 50. *Borrichia.*
Herbs.
Annual, with white rays . . . . . 44. *Eclipta.*
Perennial, with yellow rays.
Outer involucre of 4 connate bracts . . . . . 45. *Tetragonotheca.*
Outer involucral bracts not connate.
Weak creeping herb . . . . . 49. *Spilanthes.*
Stout erect herbs.
Achenes laterally flattened . . . . . 53. *Verbesina.*
Achenes thickish . . . . . 43. *Heliopsis.*
r. Disk-flowers not maturing achenes; disk chaffy.
Achenes thickish, not strongly flattened.
Inner bracts of the involucre not armed . . . . . 33. *Polymnia.*
Inner bracts of the involucre glochidiate, closely investing the achenes . . . . . 34. *Acanthospermum.*
Achenes flattened dorsally, *i.e.* parallel with the chaff.
Rays 5, obcordate, scarcely exceeding the disk, whitish . . 38. *Parthenium.*
Rays yellow, much longer than the disk.
Achenes wing-margined, in several rows . . . . . 35. *Silphium.*
Achene wingless, in a single row.
Rays 5; leaves serrate . . . . . 37. *Chrysogonum.*
Rays usually more numerous; leaves dentate or lyrately lobed . . . . . 36. *Berlandiera.*

Series II. All the flowers of the head with strap-shaped corolla *t.*

t. Pappus none.
Leaves basal . . . . . 90. *Arnoseris.*
Leafy-stemmed.
Involucre calyculate . . . . . 88. *Lapsana.*
Involucre not calyculate . . . . . 89. *Serinia.*
t. Pappus wholly or in part of scales.
Flowers blue, rose-colored, or rarely white . . . . . 91. *Cichorium.*
Flowers yellow . . . . . 92. *Krigia.*
t. Pappus bristle-formed, capillary *u.*
u. Bristles plumose.
Leaves basal.
Inner achenes long-beaked . . . . . 93. *Hypochaeris.*
Inner achenes not beaked . . . . . 94. *Leontodon.*
Leafy-stemmed.
Hispid-pubescent . . . . . 95. *Picris.*
Glabrous . . . . . 96. *Tragopogon.*
u. Bristles simple, at most scabrous *v.*
v. Achenes strongly muricate or spinulose above.
Leafy-stemmed . . . . . 97. *Chondrilla.*
Scapose . . . . . 98. *Taraxacum.*
v. Achenes not muricate above *w.*
w. Achenes flat or flattish.
Achenes beakless; flowers 50 or more in each head, yellow . 99. *Sonchus.*
Achenes mostly beaked; heads 6–30-flowered; flowers yellow, blue, or purple . . . . . 100. *Lactuca.*
w. Achenes columnar, often slender.
Flowers cream-color, white, rose-color, or purple.
Pappus white; heads erect . . . . . 101. *Lygodesmia.*
Pappus cream-color or tawny; heads nodding . . . . 105. *Prenanthes.*

Flowers bright yellow to deep orange-red.
  Achenes beaked.
    Achenes 10-ribbed . . . . . 102. *Agoseris.*
    Achenes 4–5-ribbed . . . . . 103. *Pyrrhopappus*
  Achenes not beaked.
    Pappus white.
      Leaves entire . . . . . 102. *Agoseris.*
      Leaves toothed or runcinate-pinnatifid . . . . 104. *Crepis.*
    Pappus tawny . . . . . 106. *Hieracium.*

1. VERNÒNIA Schreb. Ironweed

Heads discoid, 15–many-flowered, in corymbose cymes; flowers perfect; involucre shorter than the flowers, of much imbricated bracts. Achenes cylindrical, ribbed; pappus double, the outer of minute scale-like bristles, the inner of copious capillary bristles. — Perennial herbs, with leafy stems, alternate acuminate or very acute serrate leaves and mostly purple (rarely white) flowers. (Named for *William Vernon*, an early English botanist, who traveled in North America.)

Involucral bracts tipped with long filiform spreading appendages.
  Heads large, mostly 60–80-flowered; involucre 1.4–2 cm. in diameter . 1. *V. crinita.*
  Heads smaller, usually about 40-flowered; involucre about 1 cm. in diameter.
    Pappus purple or at least purplish-tinged . . . . . 2. *V. noveboracensis.*
    Pappus cream-colored or stramineous . . . . . 3. *V. glauca.*
Involucral bracts obtuse, acute, or acuminate, but not conspicuously caudate.
  Lower surface of the leaves smooth or merely puberulent.
    Cyme dense, fastigiate . . . . . 4. *V. fasciculata.*
    Cyme open and loose, the branches wide-spreading . . . . 5. *V. altissima.*
  Lower surface of the leaves tomentulose.
    Involucral bracts obtuse to acute, appressed or nearly so.
      Pappus purple . . . . . 6. *V. illinoensis.*
      Pappus tawny . . . . . 7. *V. missurica.*
    Involucral bracts with acuminate more or less squarrose tips . . 8. *V. Baldwini.*

1. **V. crinita** Raf. Tall, nearly glabrous; leaves linear-lanceolate, retrorsely denticulate; *heads large, usually* 60–80-*flowered;* involucre very squarrose, the *bracts with long filiform tips.* (*V. arkansana* DC.) — Mo., Kan., and southw.

2. **V. noveboracénsis** Willd. Rather tall (1–2 m.); leaves long-lanceolate to lance-oblong, more or less pubescent beneath, gradually narrowed but not at all acuminate toward the base; cyme open; *heads mostly* 30–40-*flowered;* involucre purplish (or in white-flowered individuals green), campanulate; the bracts ovate or lance-ovate, with loosely ascending or recurved-spreading filiform tips; *pappus purple or purplish.* — Low ground near the coast, Mass. to Va. and Miss.; reported from Pelee I., L. Erie (*Macoun*).

3. **V. glaúca** (L.) Willd. Similar to the preceding; leaves mostly broader, ovate-lanceolate, contracted at the base to an acuminately winged petiolar portion, paler and tending to be more loosely pubescent on the nerves beneath; involucral bracts mostly with shorter filiform tips; *pappus cream-colored or stramineous.* (*V. noveboracensis*, var. *latifolia* Gray.) — Pa. to Ga. and Ala.

4. **V. fasciculàta** Michx. *Leaves ascending, narrow, linear to oblong-lanceolate*, green and *nearly glabrous beneath; heads* rather small, about 20-flowered, *many, crowded, in a fastigiate cyme;* involucral bracts closely appressed, obtuse or the uppermost merely mucronate; achenes mostly smooth as seen with an ordinary lens; flowers reddish-purple. — Prairies, O. to Minn., Neb., and Okla.

5. **V. altíssima** Nutt. Usually tall (1–2 or more m. high); *leaves lance-oblong*, acuminate, *spreading, smooth or merely puberulent beneath; cyme large, widely spreading, rather loose;* heads about 25-flowered; involucral bracts closely appressed, ovate, acute, obtuse, or cuspidate, mostly purple-tinged; flowers red-purple. (*V. maxima* Small.) — Rich soil of prairies, etc., N. Y. to Mich., Mo., and southw.; also sporadic northeastw.

6. **V. illinoénsis** Gleason. Tall and rather stout; leaves large, oblong-lanceolate, acuminate, tomentulose and slightly scabrous beneath; heads medium-sized, about 40-flowered, sessile or shortly and stoutly pediceled in a

rather dense cyme; *involucre campanulate; its bracts regularly imbricated and closely appressed, chiefly rounded or obtuse*, usually purple- or violet-tinged flowers red-purple; *pappus purple.* — Rich dry prairies, s. Ont. and O. to Ill. and Ia.

7. **V. missùrica** Raf. Similar in habit to the preceding; heads 35–50-flowered; *involucre ovoid- or subcylindric-campanulate*, mostly greenish; the *bracts rather narrow, very numerous*, closely appressed, the middle and lower ones acutish; *pappus tawny* or with only a slight purple tinge. (*V. altissima*, var. *grandiflora* Gray.) — Prairies, Ill.(?) and Mo. to Tex. and Kan. — An obscure species.

8. **V. Baldwini** Torr. *Tomentulose;* heads small or medium-sized, about 30-flowered; leaves lance-oblong or -ovate; involucre hoary-tomentose and arachnoid, mostly greenish; *the bracts squarrose*, acuminate. — Prairies and barren hills, Ia. to Kan. and Tex. *V. interior* Small, though sometimes distinguishable by its less squarrose mostly purple-tinged involucral bracts, does not appear satisfactorily separable.

2. ELEPHÁNTOPUS [Vaill.] L. Elephant's-foot

Heads discoid, 2–5-flowered, several together clustered into a compound pedunculate head; flowers perfect. Involucre narrow, flattened, of 8 oblong dry bracts. Achenes 10-ribbed; pappus of stout bristles, chaffy-dilated at the base. — Perennials, with alternate leaves and purplish flowers. (Name composed of ἐλέφας, *elephant*, and πούς, *foot.*)

** Stem leafy; upper leaves very like the basal.*

1. **E. carolinianus** Willd. Somewhat hairy, corymbose, leafy; leaves ovate-oblong, thin. — Dry soil, N. J. and Pa. to Ill., Kan., and southw. (Mex., W. I.)

*** Stem scape-like, with a few bract-like leaves or naked.*

2. **E. tomentòsus** L. Somewhat hairy; basal leaves obovate to narrowly spatulate, silky and prominently veined beneath; heads large; pappus-scales attenuate. — Va. to Ky., Ark., and southw.

3. **E. nudàtus** Gray. Strigose-puberulent; basal leaves thin, green, spatulate-obovate or oblanceolate, not prominently veined beneath; heads smaller; pappus-scales broadly deltoid. — Del. to Ark., and southw.

3. SCLERÓLEPIS Cass.

Head discoid, many-flowered; flowers perfect. Involucral bracts linear, equal, in 1 or 2 rows. Receptacle naked. Corolla 5-toothed. Achenes 5-angled; pappus a single row of 5 almost horny oval and obtuse scales. — Smooth perennial, with simple stems, rooting at the base, linear entire leaves in whorls of 4–6, and a terminal head of flesh-colored flowers in summer. (Name composed of σκληρός, *hard*, and λεπίς, *a scale*, from the pappus.)

1. **S. uniflòra** (Walt.) BSP. (*S. verticillata* Cass.) — In water or sandy bogs, Bradford, N. H. (*F. T. Lewis*); pine barrens, from N. J. southw.

4. EUPATÒRIUM [Tourn.] L. Thoroughwort

Heads discoid, 3–many-flowered; flowers perfect. Involucre cylindrical or bell-shaped, of more than 4 bracts. Receptacle flat or conical, naked. Corolla 5-toothed. Achenes 5-angled; pappus a single row of slender capillary barely roughish bristles. — Erect perennial herbs, often sprinkled with bitter resinous dots, with generally corymbose heads of white, bluish, or purple blossoms, appearing near the close of summer. (Dedicated to *Eupator Mithridates*, who is said to have used a species of the genus in medicine.)

§ 1. EUPATÒRIUM proper. *Receptacle flat.*

* *Heads cylindrical, 3–15-flowered; the purplish bracts numerous, closely imbricated in several rows, of unequal length, slightly striate; stout herbs, with ample mostly whorled leaves, and flesh-colored flowers.*

1. **E. purpùreum** L. (Joe-Pye Weed, Trumpet Weed.) Stems tall (0.5–3 m. high) and stout, simple; leaves 3–6 in a whorl, oblong-ovate or lanceolate, acuminate, thin, smoothish, rather finely crenate-dentate; inflorescence hemispherical, ovoid, or pyramidal-paniculate, the branches long and spreading, much overtopping the leaves; flowers pale pink or whitish. (*E. trifoliatum* L.) — Low grounds, often in woods and thickets, N. H., westw. and southw. Var. angustifòlium T. & G. (var. *falcatum* Britton), with narrowly oblong-lanceolate to lance-linear often falcate leaves, seems to be only a weak form or state.

Var. **maculàtum** (L.) Darl. More pubescent, with thicker more rugose ovate to ovate-oblong incisely and coarsely toothed leaves and flattish-topped cymose-panicles of more crowded rose-purple or paler heads. (*E. maculatum* L.) — Generally in wetter places, Nfd., westw. and southw.

Var. **amoènum** (Pursh) Gray. Low; leaves fewer, often opposite, ovate or oblong; heads few. — Range of the preceding variety.

Var. **foliòsum** Fernald. Leaves thin, elongate, the upper much overtopping the compact flat-topped inflorescence. — Nfd. to n. Mich. and Ia.

* * *Heads 3–20-flowered; involucre of 8–15 more or less imbricated and unequal bracts, the outer ones shorter; flowers white or nearly so.*

+ *Leaves all alternate, mostly dissected; heads panicled, very small, 3–5-flowered.*

2. **E. capillifòlium** (Lam.) Small. (Dog Fennel.) Smooth or nearly so, paniculately much branched, 1–3 m. high, leaves 1–2-pinnately parted, filiform, (*E. foeniculaceum* Willd.) — Va., near the coast, and southw.; adventive near Philadelphia.

+ + *Leaves long-petioled, the upper ones alternate; heads 12–15-flowered, in compound corymbs.*

3. **E. serótinum** Michx. Stem pulverulent-pubescent, bushy-branched, 1–2 m. high; leaves ovate-lanceolate, tapering to a point, triple-nerved and veiny, coarsely serrate, 0.5–1.5 dm. long; involucre very pubescent. — Alluvial ground, Md. to Minn., e. Kan., and southw.

+ + + *Leaves sessile or nearly so, with a narrow base, mostly opposite; heads mostly 5-flowered.*

++ *Involucral bracts with white and scarious acute tips.*

4. **E. álbum** L. *Roughish-hairy*, 3–8 dm. high; *leaves oblong-lanceolate, coarsely toothed, veiny;* heads clustered in the corymb; *involucral bracts* closely imbricated, rigid, narrowly lanceolate, *longer than the flowers.* — Sandy and barren places, pine barrens of L. I. to Va., and southw.; also dry slopes of the southern Alleghenies.

Var. **subvenòsum** Gray. Less rough; leaves 2.5–5 cm. long, finely toothed and less veiny. — L. I. and N. J.

5. **E. leucólepis** T. & G. Minutely pubescent, simple, 3–6 dm. high; *leaves linear-lanceolate, closely sessile, 1-nerved,* obtuse, *minutely serrate, rough both sides;* corymb hoary. — Sandy bogs, L. I., N. J., and southw.

++ ++ *Bracts not scarious or only obscurely so, obtuse, at length shorter than the flowers.*

6. **E. hyssopifòlium** L. Minutely pubescent, 3–6 dm. high; *leaves narrow, linear or nearly so,* 3–5 cm. long, obtuse, 1–3-nerved, *entire,* or the lower toothed, often crowded in the axils, *acute at the base.* — Sterile soil, Mass. to Va., e. Ky., and southw.

7. **E. Torreyànum** Short. Erect, slender, 8–12 dm. high, grayish-puberulent; *leaves* narrowly *lanceolate, coarsely toothed*, the larger ones 5–7 cm. long, 8–12 mm. wide, commonly proliferous in the axils; corymbs flat-topped; heads small; involucral scales woolly. (*E. hyssopifolium*, var. *laciniatum* Gray.) — Barrens, etc., Pa., Ky., and southw.

8. **E. semiserràtum** DC. Minutely velvety-pubescent, branching, 6–9 dm. high; *leaves lanceolate or oblong, triple-ribbed and veiny*, serrate above the middle, *tapering to the base*, 1.5–2.5 cm. wide, the lower slightly petioled; heads small. — Damp soil, Va. to Mo., and southw. — Leaves sometimes whorled in threes, or the upper alternate.

9. **E. altíssimum** L. Stem stout and tall, 1–2 m. high, *downy; leaves lanceolate, tapering at both ends, conspicuously 3-nerved*, entire, or toothed above the middle, 0.5–1.3 dm. long, the uppermost alternate; corymbs dense; *bracts of the involucre obtuse*, shorter than the flowers. — Dry soil, Pa. to Minn., Neb., and southw.

← ← ← ← *Leaves sessile or nearly so, with a broad base, opposite or in threes; heads pubescent.*

↔ *Heads 5–8-flowered; leaves not clasping.*

10. **E. verbenaefòlium** Michx. Roughish-pubescent, 0.5–2.5 m. high; *leaves ovate-oblong and ovate-lanceolate*, obtuse or truncate at base, slightly triple-nerved, veiny, *coarsely toothed or incised toward the base, the lower shortly petioled, the upper usually alternate;* branches of the corymb few, unequal; *bracts of the involucre oblong-lanceolate, at length shorter than the flowers.* (Including var. *Saundersii* Porter; *E. teucrifolium* Willd.) — Low grounds, Mass. to Va., and southw., near the coast.

11. **E. rotundifòlium** L. Downy-pubescent, 3–8 dm. high; *leaves roundish-ovate, obtuse*, truncate or slightly heart-shaped at the base, crenate or crenate-serrate, triple-nerved, veiny, roughish, 2.5–5 cm. long; corymb large and dense; *bracts of the 5-flowered involucre linear-lanceolate*, slightly pointed. —Dry soil, R. I. to Va., Ark., and southw., chiefly near the coast.

12. **E. pubéscens** Muhl. Pubescent, 7–12 dm. high; *leaves ovate, acute*, hardly truncate at base, strongly serrate; heads 5–8-flowered. (*E. rotundifolium*, var. *ovatum* Torr.) — Rocky woods, s. Me. to Va. and Ky., chiefly near the coast.

13. **E. sessilifòlium** L. (Upland Boneset.) Stem tall (0.5–1.8 m. high), *smooth*, branching; *leaves oblong- or ovate-lanceolate, tapering from near the rounded sessile base to the sharp point*, serrate, veiny, smooth, 0.7–1.5 dm. long; corymb very compound, pubescent; *bracts of the 5-flowered involucre oval and oblong, obtuse.* — Copses and banks, Vt. and Mass. to Ill., Mo., and southw. along the mts.

Var. **Brittoniànum** Porter. Leaves ovate or ovate-oblong, acute or short-acuminate, 2.5–4 cm. long; inflorescence very contracted. — Budd's Lake, N. J. (*Porter*).

↔ ↔ *Leaves opposite, clasping or united at the base, long, widely spreading; heads 10–40-flowered; corymbs very compound and large.*

14. **E. perfoliàtum** L. (Thoroughwort, Boneset.) Stem stout, 0.5–1.5 m. high, *hairy; leaves lanceolate, united at the base around the stem* (connate-perfoliate), tapering to a slender point, serrate, very veiny, wrinkled, downy beneath, 1–2 dm. long; bracts of the involucre linear-lanceolate. — Low grounds, common and well known. Var. truncàtum Gray. At least the upper leaves separate, truncate or rounded at base. — With the typical form.

Var. **cuneàtum** Engelm. Leaves smaller, narrowed at base and separate; the heads fewer-flowered. — Mo., and southw. — Perhaps a hybrid with no. 8.

15. **E. resinòsum** Torr. *Minutely velvety-downy*, 6–9 dm. high; *leaves linear-lanceolate, elongated*, serrate, *partly clasping*, tapering to the point, slightly veiny beneath, 1–1.5 dm. long; bracts of the involucre oval, obtuse. — Wet pine barrens, N. J. — Name from the copious resinous globules of the leaves.

* * * *Heads 8–30-flowered; involucral bracts nearly equal, in one row or but a very few of the outermost shorter; leaves opposite, ovate, petioled, triple-nerved, not resinous-dotted.*

← *Leaves broadly ovate; flowers pure white.*

16. **E. urticaefòlium** Reichard. (White Snakeroot.) Smooth, branching, 0.5–1 m. high; *leaves* broadly ovate, *pointed*, coarsely and *sharply toothed*, *long-petioled*, *thin*, 7–12 cm. long; corymbs compound. (*E. ageratoides* L. f.) — Rich woods, not rare. Var. villicaúle Fernald. Stems and petioles viscid-villous. — Pa. (*Heller*) to Va. (*Curtiss*).

17. **E. aromáticum** L. Smooth or slightly downy; stems nearly simple; *leaves on short petioles*, ovate, rather *obtusely toothed*, *not pointed*, *thickish*. — Copses, etc., Mass. to Fla., near the coast. — Not aromatic.

← ← *Leaves deltoid-ovate; flowers pink to pale purple.*

18. **E. incarnàtum** Walt. Freely branched, 6–12 dm. high, puberulent; branches spreading-ascending; leaves rather narrowly deltoid-ovate, long-pointed, coarsely crenate-serrate or bluntly toothed; slender petioles mostly 1–4 cm. long. — Va. (*Mackenzie*) and Ky. to Fla. and Tex.

§ 2. CONOCLÍNIUM (DC.) Baker. *Receptacle conical; involucral bracts nearly equal, somewhat imbricated.*

19. **E. coelestinum** L. (Mist-flower.) Somewhat pubescent, 0.3–1 m. high; leaves opposite, petiolate, triangular-ovate and slightly heart-shaped, coarsely and bluntly toothed; heads many-flowered, in compact cymes; flowers blue or violet. — Rich soil, N. J. to Mich., Kan., and southw.

5. MIKÀNIA Willd. Climbing Hemp-weed

Heads discoid, 4-flowered. Involucre of 4 bracts. Receptacle small. Flowers, achenes, etc., as in *Eupatorium*. — Twining perennials, with opposite commonly heart-shaped and petioled leaves, and corymbose-panicled flesh-colored flowers. (Named for *Joseph Gottfried Mikan*, 1743–1814, professor in the University of Prague.) Willugbaeya Neck.

1. **M. scándens** (L.) Willd. Nearly smooth; leaves somewhat triangular-heart-shaped or halberd-form, pointed, toothed at the base. (*Willoughbya* Ktze.) — Copses along streams, and in sandy swamps, s. Me. to Fla., chiefly near the coast, w. to Ont., and s. to Miss. and Tex. July–Sept.

6. TRÍLISA Cass.

Heads discoid, 5–10-flowered; flowers perfect. Involucral bracts nearly equal, little imbricated. Receptacle naked. Corolla-lobes short-ovate or oblong. Achenes 10-ribbed; pappus of rather rigid bristles, not plumose. — Perennial herbs, fibrous-rooted, with broad entire leaves, obscurely or not at all punctate, and cymules of small heads in a thyrse or panicle. Flowers rose-purple, in autumn. (Name an anagram of *Liatris*.)

1. **T. paniculàta** (Walt.) Cass. *Viscid-hairy;* leaves narrowly oblong or lanceolate, smoothish, those of the stem partly clasping; *heads panicled*. — Low pine barrens, Va., and southw.

2. **T. odoratíssima** (Walt.) Cass. *Very smooth;* leaves obovate-spatulate, pale; *heads corymbed;* plant with the odor of vanilla when bruised. — S. C. to Fla., and said to reach our limits in s. Va.

7. BRICKÉLLIA Ell.

Characters as in *Kuhnia;* involucral bracts more numerous. Bristles of the pappus merely scabrous or at most barbellate or subplumose. Leaves often all opposite. (In memory of *Dr. John Brickell* of Savannah, Ga., amateur botanist

and helpful correspondent of Muhlenberg, Fraser, and others.) COLEOSANTHUS Cass.

1. B. grandiflòra (Hook.) Nutt. Nearly glabrous, 6–9 dm. high; leaves deltoid, cordate, the upper deltoid-lanceolate, coarsely dentate-serrate, acuminate, 1 dm. long or less; heads about 40-flowered. (*Coleosanthus* Ktze.) — Mo. and Kan., westw. and southwestw.

8. KÙHNIA L.

Heads discoid, 10–25-flowered; flowers perfect. Involucral bracts thin, few, and loosely imbricated, narrow, striate-nerved. Corolla slender, 5-toothed. Achenes cylindrical, 10-striate; pappus a single row of very plumose bristles. — A perennial herb, resinous-dotted, with mostly alternate leaves, and paniculate-corymbose heads of cream-colored flowers. (Dedicated to *Dr. Adam Kuhn* of Philadelphia, who carried the living plant to Linnaeus.)

1. K. eupatorioìdes L. Stems 3–9 dm. high; pubescence minute; leaves varying from broadly lanceolate and toothed to linear and entire. — Dry soil, N. J. to Minn., S. Dak., and southw. Sept. — Very variable. Var. CORYMBULÒSA T. & G. Stouter and somewhat more pubescent, the heads rather crowded. (*K. glutinosa* Ell.) — Ill., westw. and southw.

9. LIÀTRIS Schreb. BUTTON SNAKEROOT. BLAZING STAR

Heads discoid, few–many-flowered; flowers perfect. Involucral bracts well imbricated, appressed. Receptacle naked. Corolla 5-lobed, the lobes long and slender. Achenes slender, tapering to the base, 10-ribbed. Pappus of 15–40 capillary plumose or barbellate bristles. — Perennial herbs, often resinous-dotted, with simple stems from a roundish corm or tuber, rigid alternate narrow entire leaves (sometimes twisted so as to become vertical), and spicate or racemed handsome rose-purple flowers, late in summer or in autumn. (Derivation of name unknown.) LACINARIA Hill. LACINIARIA Hill.

* *Pappus very plumose; bracts of the 5-flowered involucre with ovate or lanceolate spreading petal-like (rose or sometimes white) tips, exceeding the flowers.*

1. L. élegans (Walt.) Willd. Stem (0.6–1 m. high) and involucre hairy; leaves linear, short and spreading; spike or raceme compact, 1–5 dm. long. (*Laciniaria* Ktze.) — Barren soil, Va., and southw.

** *Pappus very plumose; bracts of the cylindrical many-flowered involucre imbricated in many rows, the tips rigid, not petal-like; corolla-lobes hairy within.*

2. L. squarròsa Willd. (BLAZING STAR, etc.) Often hairy, 1.5–6 dm. high; leaves rigid, linear, elongated; heads usually few, 1.5–3.5 cm. long; *bracts mostly with elongated and leaf-like spreading tips.* (*Laciniaria* Hill.) — Dry soil, Pa. to Minn., and southw. Var. INTERMÈDIA (Lindl.) DC. Heads narrow; bracts shorter, erect or nearly so. (*Lacinaria squarrosa*, var. Porter.) — Ont. to Neb. and Tex.

3. L. cylindràcea Michx. Commonly smooth, 1.5–5 dm. high; leaves linear; heads few, 1.5–2.5 cm. long; *bracts with short and rounded abruptly mucronate appressed tips.* (*Laciniaria* Ktze.) — Dry open places, Ont. to Minn. and Mo. — Heads sometimes reduced to a solitary slightly enlarged terminal one (var. SOLITÀRIA MacM.).

*** *Pappus very plumose; heads 4–6-flowered; bracts acuminate; corolla-lobes naked.*

4. L. punctàta Hook. Stout, 1.5–8 dm. high, from a branching or globose rootstock; leaves narrowly linear or the upper acerose, rigid; heads usually many in a dense spike. (*Laciniaria* Ktze.) — "O."; Minn., westw. and southw.

**** *Pappus not obviously plumose to the naked eye; corolla-lobes smooth inside*

5. **L. scariòsa** Willd. Stem stout, 0.3–1.8 m. high, pubescent or hoary; *leaves* (smooth, rough, or pubescent) *lanceolate; the lowest oblong-lanceolate or obovate-oblong*, tapering into a petiole; heads few or many, large, 25–40-flowered; *bracts of the broad or depressed involucre obovate or spatulate, very numerous, with dry and scarious often colored tips or margins.* (*Laciniaria* Hill.) — Dry soil, s. Me. to Ont., Neb., and southw. — Widely variable; heads 2.5 cm. or less in diameter.

Var. **squarrulòsa** (Michx.) Gray. Slender; heads smaller, 14–20-flowered; bracts numerous. (*Lacinaria scariosa*, var. Small.) — Open woods, Va., and southw.

6. **L. pycnostàchya** Michx. Hairy or smoothish; stem stout, 0.5–1.5 m. high, very leafy; leaves linear-lanceolate, the upper very narrowly linear; *spike thick and dense*, 1.5–5 dm. long; heads about 5-flowered, 1 cm. long; *bracts of the cylindrical involucre oblong or lanceolate, with recurved or spreading colored tips.* (*Laciniaria* Ktze.) — Prairies, from Ind. to Minn., Neb., and southw.

7. **L. spicàta** (L.) Willd. Smooth or somewhat hairy; stems very leafy, stout, 0.5–1.8 m. high; leaves linear, the lower 3–5-nerved; heads 8–12-flowered, 1 cm. long, crowded in a long spike; *bracts of the cylindrical-bell-shaped involucre oblong or oval, obtuse, appressed, with slight margins; achenes pubescent or smoothish.* (*Laciniaria* Ktze.) — Moist grounds, Mass. to s. Ont., Minn., and southw. — Involucre often resinous, very smooth.

Var. **montàna** Gray. Low and stout; leaves broader, obtuse; spike short and heads large. (*Lacinaria spicata*, var. *pumila* Porter.) — Mountain-tops, Va., and southw.

8. **L. graminifòlia** (Walt.) Willd. Hairy or smoothish; stem 3–9 dm. high, slender, leafy; leaves linear, elongated, 1-nerved; heads several or numerous, in a spike or raceme, 7–12-flowered; *bracts of the obconical or obovoid involucre spatulate or oblong, obtuse, or somewhat pointed, rigid, appressed; achenes hairy.* (*Laciniaria* Ktze.; *Lacinaria Smallii* Britton.) — Va., and southw. — Inflorescence sometimes panicled, especially in

Var. **dùbia** Gray. Bracts of involucre narrower and less rigid, oblong, often ciliate. (*Lacinaria graminifolia*, var. *pilosa* Britton.) — Wet pine barrens, N. J., and southw.

10. GRINDÈLIA Willd. Gum-plant. Tar-weed

Heads many-flowered, radiate (or rayless); rays pistillate. Bracts of the hemispherical involucre imbricated in several series, with slender more or less spreading green tips. Achenes short and thick, compressed or turgid, truncate, glabrous; pappus of 2–8 caducous awns. — Coarse perennial or biennial herbs, often resinous-viscid, ours glabrous and leafy with sessile or clasping alternate and spinulose-serrate or laciniate rigid leaves, and large heads terminating leafy branches. Disk and ray yellow. (Named for *Prof. David Hieronymus Grindel*, 1776–1836, a Russian botanist.)

1. **G. squarròsa** (Pursh) Dunal. Leaves spatulate- to linear-oblong; *involucre squarrose;* achenes not toothed; pappus-awns 2 or 3. — Prairies and dry banks, Ill. to Minn., southw. and westw.; rarely adv. eastw. July–Oct. Var. **nùda** (Wood) Gray. Rays wanting. — Mo., and westw.

2. **G. lanceolàta** Nutt. Leaves lanceolate or linear; *involucral bracts erect* or the lower tips spreading; achenes with 1 or 2 short teeth at the summit; awns 2. — Prairies and barrens, Tenn., Mo., Kan., and southw. July, Aug.

11. GUTIERRÈZIA Lag.

Heads few–several-flowered, radiate; rays 1–6, pistillate. Involucre cylindric-clavate; bracts coriaceous, with green tips, closely imbricated, the outer shorter. Receptacle small, naked. Achenes short, terete; pappus of about 9 chaffy scales, shorter in the ray-flowers. — Suffrutescent (our species), glabrous,

and often glutinous, much branched, with narrowly linear entire alternate leaves, and small heads of yellow flowers in fastigiate or paniculate cymes. (Named for *Pedro Gutierrez*, correspondent of the botanical garden of Madrid.)

1. G. Saròthrae (Pursh) Britton & Rusby. Low; leaves numerous, 1–5 cm. long; heads usually crowded, the disk- and short ray-flowers usually 3 or 4 each. (*G. Euthamiae* T. & G.) — Dry plains, Man. and Minn., westw. and southwestw. July–Sept.

12. AMPHIÁCHYRIS (DC.) Nutt.

Heads hemispherical; rays 5–10. Disk-flowers perfect but infertile. Pappus of the rays minute, coroniform; of the disk-flowers of bristle-like scales, more or less dilated and united at base. — A diffusely much branched annual, with heads solitary on the branchlets; otherwise as *Gutierrezia*. (From ἀμφί, *around*, and ἄχυρον, *chaff*.)

1. A. dracunculoìdes (DC.) Nutt. Low, slender; leaves narrowly linear, the upper filiform; disk-flowers 10–20, their pappus of 5–8 bristle-like scales united at base and slightly dilated upward. — Plains, Mo., Kan., and southw. Aug., Sept.

13. HETEROTHÈCA Cass.

Characters as in *Chrysopsis*, but the achenes of the ray thickish or triangular, without pappus or obscurely crowned, and those of the disk compressed, with a double pappus, the inner of numerous long bristles, the outer of many short and stout bristles. — (From ἕτερος, *different*, and θήκη, *case*, alluding to the unlike achenes.)

1. H. subaxillàris (Lam.) Britton & Rusby. Annual or biennial, 3–9 dm. high, bearing numerous small heads; leaves oval or oblong, the lower with petioles auricled at base, the upper mostly subcordate-clasping. (*H. Lamarckii* Cass.) — Sandy soil, near the coast, Del. to Fla. and Tex., inland to Kan., N. Mex., and Ariz.; locally on ballast northw. July–Sept. (Mex.)

14. CHRYSÓPSIS Nutt. Golden Aster

Heads many-flowered, radiate; the rays numerous, pistillate. Involucral bracts linear, imbricated, without herbaceous tips. Receptacle flat. Achenes obovate or linear-oblong, flattened, hairy; pappus in all the flowers double, the outer of very short and somewhat chaffy bristles, the inner of long capillary bristles. — Chiefly perennial low herbs, woolly or hairy, with rather large often corymbose heads terminating the branches. Disk- and ray-flowers yellow. (Name composed of χρυσός, *gold*, and ὄψις, *aspect*, from the golden blossoms.)

* *Leaves narrowly lanceolate or linear; achenes linear.*

1. C. graminifòlia (Michx.) Nutt. *Silvery-silky*, with long close-pressed hairs; stem slender, often with runners from the base, naked above, bearing few heads; *leaves lanceolate or linear, elongated, grass-like, nerved, shining*, entire. — Dry sandy soil, N. J. and Del. to Ky., southw. and southwestw. July–Oct.

2. C. falcàta (Pursh) Ell. *Stems* 1–3 dm. high, *very woolly; leaves crowded, linear, rigid, about* 3-*nerved*, entire, *somewhat recurved or scythe-shaped, hairy*, or smooth when old, sessile; heads small, corymbed. — Dry sandy soil on the coast, pine barrens of N. J. to Cape Cod, Mass. July–Sept.

* * *Leaves oblong or lanceolate, entire or slightly serrate, mostly sessile, veined, not nerved; achenes obovate, flattened.*

+ *Pubescence soft-villous or arachnoid and floccose.*

3. C. mariàna (L.) Nutt. *Perennial, silky with long and weak hairs*, or when old smoothish; *leaves oblong;* heads corymbed, on glandular peduncles. — Dry barrens, from s. N. Y. and Pa. southw. Aug.–Oct.

4. **C. gossýpina** (Michx.) Nutt. *Biennial, densely lanate*, the pubescence becoming floccose; *leaves short-spatulate to oblong*, rounded at tip, *white-lanate*; heads few, long-peduncled; involucre woolly or becoming glabrate and merely glandular. (*C. pilosa* Britton, not Nutt.) — Pine barrens, Va. to Fla.

+ + *Stems hirsute to villous, the hairs persistent.*

5. **C. villòsa** Nutt. Hirsute and villous-pubescent; stem corymbosely branched, the branches terminated by single short-peduncled heads; *leaves narrowly oblong, hoary with rough pubescence (as also the involucre), bristly-ciliate* toward the base; *achenes 3–5-nerved; outer pappus setulose-squamellate.* (*C. camporum* Greene.) — Dry plains and prairies, Man. and Wisc. to Ky., westw. and southw. July–Sept.

6. **C. pilòsa** Nutt. Annual, soft-hirsute or villous; *leaves oblong-lanceolate; involucre viscid; achenes 10-nerved; outer pappus chaffy and conspicuous.* (*C. Nuttallii* Britton.) — Open places, Kan., and southw.

15. SOLIDÀGO L. Golden-rod

Heads few–many-flowered, radiate; the rays 1–16, pistillate. Bracts of the involucre appressed, destitute of herbaceous tips (except nos. 1 and 2). Receptacle small, not chaffy. Achenes many-ribbed, nearly terete; pappus simple, of equal capillary bristles. — Perennial herbs, with mostly wand-like stems and sessile or nearly sessile never heart-shaped stem-leaves. Heads small, racemed or clustered; flowers both of the disk and ray yellow (cream-color in no. 6). Closely related species tending to hybridize freely. (Name from *solidare*, to join, or make whole, in allusion to reputed vulnerary qualities.)

§ 1. VIRGAÚREA DC. *Rays mostly fewer than the disk-flowers; heads all more or less pediceled.*

* *Bracts of the much imbricated and rigid involucre with abruptly spreading herbaceous tips; heads in clusters or glomerate racemes, disposed in a dense somewhat leafy and interrupted wand-like compound spike.*

1. **S. squarròsa** Muhl. Stem stout, 0.2–1.5 m. high, hairy above; *leaves large*, oblong, or *the lower* spatulate-oval and *tapering into a margined petiole*, serrate, veiny; heads numerous; bracts obtuse or acute; disk-flowers 16–24, the *rays* 12–16. — Rocky and wooded hills, N. B. to Ont., s. to Va. and O.; rare southw. Aug.–early Oct.

2. **S. petiolàris** Ait. Minutely hoary or downy; stem strict, simple, 0.2–1 m. high; *leaves small* (1–7 dm. long), oval or oblong, mucronate, veiny, rough-ciliolate, minutely puberulent, dull or slightly lustrous; the upper entire and abruptly very short-petioled, the lower often serrate and tapering to the base; heads few, in a wand-like raceme or panicle, on slender bracted pedicels; *rays about* 10, elongated; bracts of the pubescent involucre lanceolate or linear-awl-shaped, the outer loose and spreading, more or less foliaceous. — Dry woods, s. w. Ill. to Kan., N. C., and southw. Aug.–Oct. — The name is misleading, as the leaves are hardly petioled. Var. Wárdii (Britton) Fernald. Leaves firm and strongly glutinous, somewhat lustrous. (*S. Wardii* Britton.) — Open rocky or sandy ground, Mo. and Kan. to Tex.

* * *Involucral bracts without green tips and wholly appressed.*

+ *Heads small; the involucres 2–5 (rarely 6) mm. long, clustered along the stem in the axils of the feather-veined leaves, or the upper forming a thyrse.*

+ + *Achenes pubescent.*

= *Stem terete, mostly glaucous (the bloom easily rubbed off).*

3. **S. caèsia** L. Smooth; at length much branched and diffuse; leaves lanceolate or oblong-lanceolate, serrate, pointed, sessile; heads in very short clusters, or somewhat racemose-panicled on the branches. — Deciduous woods, s. Me. to Ont., Minn., and southw. Aug.–Oct. Var. axillàris (Pursh) Gray

Mostly simple; leaves thin, elongate-lanceolate, all much exceeding the very small axillary clusters. — N. S. to Que., Ont., and southw. Var. PANICULÀTA Gray. Paniculately branched; leaves smaller; heads densely racemose-panicled. — Rich woods and clearings, from s. Me. southw.

= = *Stem angled, not glaucous.*

4. **S. latifòlia** L. Smooth or nearly so; stem *zigzag*, simple or paniculate-branched, 0.3–1 m. high; *leaves broadly ovate or oval, very strongly and sharply serrate, conspicuously pointed at both ends*, thin, 0.5–1.5 dm. long, *the lower abruptly narrowed to winged petioles;* heads in very short axillary clusters, or the clusters somewhat prolonged at the ends of the branches; rays 3–4. (*S. flexicaulis* L., in part.) — Moist shaded banks, throughout; commonest northw., and s. along the mts. Late July–early Oct.

5. **S. Curtísii** T. & G. Smooth or nearly so; stem usually branched; *leaves oblong to long-lanceolate with gradually narrowed entire base*, serrate above with subulate teeth; heads in small loose clusters; rays 4–7. — Open woods at low elevations in the mountains, Va., W. Va., Ky., and southw. Aug.–Oct. Var. PÙBENS (M. A. Curtis) Gray. Stems and often the under surfaces of the leaves tomentose. — Similar range.

+ + *Achenes glabrous (rarely a little setulose); inflorescence more thyrsoid.*

= *Stems pubescent.*

6. **S. bícolor** L. Hoary or grayish with soft hairs (rarely glabrate); stem simple or paniculate-branched; leaves oblong or elliptical-lanceolate, acute at both ends, or the lower oval and tapering into a petiole, slightly serrate; *clusters or short racemes from the axils of the upper leaves*, forming an interrupted spike or crowded panicle; *involucre 3–5 mm. long; the chartaceous whitish-yellow obtuse bracts usually with the greenish midrib slender below but conspicuously dilated above; rays 5–14, small, cream-color or nearly white;* achenes columnar. — Dry soil, P. E. I. to Ga., rarely inland to Ky., Mich., and Ont. Late Aug.–Oct.

7. **S. híspida** Muhl. Similar; cauline leaves oblanceolate to narrowly obovate, narrowed at base, blunt or acutish at tip; basal leaves mostly rounded at tip, crenate-serrate; *involucre 4–6 mm. long; the subherbaceous greenish or greenish-straw-colored* obtuse *bracts usually with the green midrib nearly uniform or only obscurely dilated above; rays orange-yellow;* achenes slightly broadened upward. (*S. bicolor*, var. *concolor* T. & G.) — Dry or rocky banks, Nfd. to Man., s. to the mts. of Ga., Mich., and Mo.; chiefly in calcareous districts. July–early Sept.

= = *Stems glabrous or essentially so.*

8. **S. erécta** Pursh. Glabrous, or merely puberulent above; *leaves thickish, firm*, the lowest oblong or ovate-spatulate, *crenate*, the others narrower, entire; inflorescence as in no. 6; rays pale yellow or cream-colored. — Dry soil, L. I., N. J., Pa., and southw. Aug.–Oct.

9. **S. montícola** T. & G. Nearly glabrous; stem slender, 3–9 dm. high; *leaves thin*, oblong-ovate to lanceolate, *acute or tapering at both ends*, the lower *serrate;* heads small, the bracts acutish; rays 5–6. (*S. roanensis* Porter.) — Allegheny Mts., from Pa. southw. July–Sept.

+ + *Heads mostly large, the involucres 6(rarely 5)–12 mm. long, many-flowered, forming an erect terminal thyrse; leaves feather-veined.*

+ + *Leaves numerous, short, sessile, entire, uniform in size and shape; cinereous plant of the Southwest.*

10. **S. Lindheimeriàna** Scheele. Somewhat cinereous-puberulent, 2.5–8 dm. high; leaves lanceolate to oblong, sessile, subacute, often glutinous; inflorescence dense; involucre slender-campanulate, 5.5–7 mm. long; achenes glabrous. — Limestone bluffs and gravel, and in rocky woods, Kan. to Tex. Sept.–Nov.

++ ++ *Leaves elongate, the basal much larger than the upper and more or less petioled; green plants of northern and mountainous regions.*

= *Leaves thin, the basal with ovate or oblong blades, sharp-serrate, abruptly narrowed to the comparatively slender petioles.*

11. S. macrophýlla Pursh. Stem stout, 3.5–12 dm. high, pubescent at summit, simple below the inflorescence; *leaves very thin, scattered, irregularly and coarsely serrate with sharp salient teeth, all but the uppermost abruptly contracted into long margined petioles*, the lowest with blades 5–20 cm. long; heads many-flowered, in a wand-like compound raceme or contracted panicle 1–6 dm. long, *the lower heads much exceeded by their subtending leaves; involucre* slender-campanulate or thick-cylindric, 8–12 *mm. long;* its bracts thin, scarious, linear-attenuate; rays 8–10, elongated; *achenes smooth*, 3–4 *mm. long.* — Woods, Nfd. to L. Superior, s. to N. S., N. B., e. and centr. Me., and on upland slopes to Mt. Monadnock, N. H., Mt. Greylock, Mass., and the Catskill Mts., N. Y. July–early Sept.

Var. thyrsoídea (Mey.) Fernald. Lower; the involucre much fuller and broader (8–20 mm. broad), subglobose to cup-shaped; its bracts firmer, often subherbaceous, narrowly deltoid to lanceolate. — Lab. to alpine regions of Gaspé Co., Que., Mt. Katahdin, Me., and Mt. Washington, N. H. July, Aug.

12. S. calcícola Fernald. Stems 2–10 dm. high, purplish, simple or with few erect branches, glabrous below, pubescent and somewhat glutinous above, *very leafy to the inflorescence; basal leaves elliptic, sharp-serrate, slenderly wing-petioled; the cauline* oblanceolate, acuminate, sharply and irregularly *serrate above the middle, entire below* and narrowed to broad-winged petioles, or the uppermost sessile; inflorescence from racemo-thyrsoid to thyrsoid-paniculate; *involucre* 6–8 *mm. long*, its bracts mostly lance-attenuate, acute or acutish; rays rather short; *achenes pubescent*, 1–2 *mm. long.* — Calcareous cliffs and rich woods, Gaspé Co., Que., to Aroostook Co., Me. Aug., Sept.

= = *Leaves thick and firm, the basal with the oblanceolate, spatulate, or narrowly obovate blades crenate or crenate-serrate (rarely sharp-serrate) and tapering gradually to the winged petioles.*

a. Involucre 30–50-*flowered; cauline leaves* 2–4 (*rarely* 5) *below the inflorescence.*

13. S. Cutlèri Fernald. *Dwarf* (5–25 cm. high); the *stem* rather prominently *angled;* basal leaves obovate to broadly oblanceolate, crenate to serrate above the middle; *the few cauline leaves* oblanceolate to spatulate, *of nearly uniform size;* inflorescence a few-headed terminal corymb or frequently the heads clustered in the axils of *the rather large divergent upper leaves;* heads very full; the short campanulate *involucre* 6–8 mm. high, 7–10 *mm. broad*, composed of *subherbaceous* often glutinous *oblong or lanceolate* obtuse to acutish *bracts; achenes* 3–3.5 *mm. long, hirsute with spreading-ascending short hairs;* pappus barbellate. (*S. Virgaurea*, var. *alpina* Bigel.; *S. alpestris* of recent Am. auth., not Waldst. & Kit.) — Highest alpine districts of Me., N. H., Vt., and N. Y. July–early Sept.

b. Involucre 15–30-*flowered; cauline leaves (except in abnormally floriferous individuals) more numerous*, 5(*rarely* 4)–30 *or more below the inflorescence.*

1. *Midrib of the leaves usually prominent beneath; inflorescence (simple or paniculately compound) dense, the pedicels rarely more than* 3–4 *mm. long.*

14. S. Rándii (Porter) Britton. Often glutinous; stems stoutish, commonly purple-tinged, glabrous below, usually puberulent above, 3–8 dm. high; *leaves numerous;* the basal narrowly obovate to oblanceolate, acute or obtuse, serrate or dentate, 7–20 cm. long; *the cauline lanceolate or oblanceolate to elliptic, gradually reduced upward, rarely bearing axillary fascicles*, the lower often serrate, *the uppermost entire and* 2–7 *cm. long;* heads crowded in a dense thyrse or at the ends of the branches of an ample panicle (1–3 dm. long); *involucre* 5–6 *mm. high*, 3–5 *mm. broad*, the bluntish or acute bracts lance-deltoid to linear; *achenes* 2–2.6 *mm. long*, sparingly appressed-setulose or glabrate; pappus barbellate. (*S. Virgaurea* of recent Am. auth., in part, not L.; *S. Vir-*

gaurea, vars. *Randii* and *Redfieldii* Porter; *S. humilis* Man. ed. 6, in part, not Pursh.) — Dry or rocky (commonly granitic, etc.) soil, e. Me. to Mich., southw. along the mts. to s. N. H. and w. Mass. July–early Sept. Passing freely to var. MONTÍCOLA (Porter) Fernald. Lower (0.5–5 dm. high), with a dense solitary thyrse 2–10 cm. long. (*S. Virgaurea*, var. Porter; *S. Virgaurea*, var. *Deanei* Porter.) — More exposed situations.

2. *Midrib of the leaves usually obscure; inflorescence* 1–*several racemes or interrupted thyrses, many of the pedicels* 5–15 (*or rarely* 25) *mm. long.*

15. **S. racemòsa** Greene. Often glutinous; *stems* usually clustered, rather strict, slender and nearly terete, *very leafy*, 1–6 dm. high; *basal and lower leaves oblanceolate, mostly acute or subacute*, 3–12 cm. long, 5–7 *mm. broad*, more or less crenate or serrate above the middle; *cauline leaves* 10–30 *or more*, oblanceolate to linear, *the uppermost entire and* 1–3.5 *cm. long, all* (*in well-developed plants*) *bearing axillary fascicles;* racemes solitary, 5–15 cm. long, rarely panicled; involucre 5–8 mm. high, the linear bracts obtuse or acutish; *achenes* 2–3 mm. long, *finely appressed-setulose; pappus minutely serrulate.* (*S. humilis* Man. ed. 6, in great part, not Pursh; *S. Purshii* Porter, as to description, but not as to type, *i.e.* the Pursh plant.) — Calcareous ledges and cliffs, local, N. B. to Va., w. to the sand-hills of L. Mich. July–Sept.

Var. **Gillmàni** (Gray) Fernald. Much larger; basal leaves 1.5–3 dm. long, coarsely toothed; the abundant racemes forming a panicle 3–4 dm. long. (*S. humilis*, var. Gray; *S. Virgaurea*, var. Porter.) — Sand-hills and rocks along the Great Lakes, Ont. and Mich.

16. **S. decúmbens** Greene. Similar; the decumbent rigid *stems* 0.5–4 dm. high, simple, *remotely leafy; basal and lower leaves spatulate-obovate to -oblanceolate, chiefly rounded or blunt at tip*, 1.5–9 cm. long, 8–20 *mm. broad*, toothed above the middle; *cauline leaves* 4–9 *below the inflorescence, without axillary fascicles;* raceme lax, 3–20 cm. long; involucre 6–7 mm. high, its firm linear bracts obtuse. — Serpentine rock, Mt. Albert, Que.; shores of L. Superior; Alb. and B. C. to Col., and Wash. July, Aug.

← ← ← *Heads small or middle-sized, the involucres* 2–5 (*rarely* 6) *mm. long, panicled or thyrsoidal, not in a terminal corymbiform cyme; neither alpine nor high-northern.*

↔ *Leaves commonly veiny, not* 3-*ribbed* (*but sometimes obscurely triple-nerved*).

= *Heads in a slender virgate or thyrsoid panicle.*

a. Stem puberulent or pulverulent.

17. **S. pubérula** Nutt. *Stem* (2–10 dm. high, simple or branched) *and panicle minutely hoary; stem-leaves numerous, lanceolate, acute, tapering to the base*, mostly entire, smoothish, *the uppermost* 1.5–5 *cm. long; the lower* wedge-lanceolate and *sparingly toothed; heads* very numerous and *crowded in compact short racemes forming a prolonged and dense* slender or pyramidal *panicle;* involucre 3–4 mm. long, its *bracts linear-awl-shaped*, appressed; rays about 10. — Dry or sandy soil, P. E. I. to w. Que., s. to Fla. and Miss., mostly near the coast. Aug.–Oct.

b. Stem glabrous.

1. *Axis and branches of the inflorescence glabrous.*

18. **S. stricta** Ait. *Very smooth* throughout; *stem strict and simple, wand-like*, 0.5–2.5 m. high, slender, *beset with small and entire appressed* lanceolate-oblong thickish *leaves, these gradually reduced upward to mere bracts* (5–15 *mm. long*); the lowest oblong-spatulate; *heads crowded in a very slender compound spicate raceme;* involucre 4–5 mm. long; rays 5–7. — Damp pine barrens and prairies, N. J. to Fla. and Tex. Sept.–Nov. (W. I.)

2. *Axis and branches of the inflorescence pubescent.*

19. **S. uliginòsa** Nutt. *Smooth up to the inflorescence;* stem simple, strict, 3–10 dm. high; *leaves* thickish, *lanceolate*, pointed, the lower 1–4 dm. long,

tapering into winged petioles, partly sheathing at the base, sparsely serrulate or entire, the uppermost 3–8 cm. long; *racemes much crowded and appressed in a dense wand-like panicle;* involucre 4–6 mm. long, its bracts linear-oblong; rays 5–6, small. — Bogs and wet shores, Nfd. to Keewatin, s. to Minn., Pa., and in the mts. to N. C. July–early Sept.

20. **S. speciòsa** Nutt. Stem stout, 0.5–2 m. high, smooth below, often roughish above; *leaves* thickish, *smooth*, with rough margins, *oval or ovate*, slightly serrate; the uppermost 2–4 cm. long, oblong-lanceolate; the lower 1.5–3 dm. long, 5–10 cm. wide, contracted into a margined petiole; *heads* somewhat crowded *in numerous erect racemes, forming an ample pyramidal or thyrsiform panicle;* peduncles and pedicels rough-hairy; involucre cylindric, often glutinous, 4.5–6 mm. long, its firm bracts oblong; rays about 5, large. — Dry open woods and thickets, local, Mass. to Minn., and southw. Sept., Oct.

Var. **angustàta** T. & G. Lower, rarely 1 m. high; leaves lanceolate to ovate-lanceolate, more nearly uniform, the lower 8–12 cm. long, 2–3 cm. wide; inflorescence usually smaller. (*S. rigidiuscula* Porter.) — Dry open ground, O. to S. Dak., and southw. Aug.-Oct.

= = *Heads paniculate, in mostly spreading or recurved-ascending secund clusters.*

a. Leaves fleshy; plant maritime.

21. **S. sempérvirens** L. Smooth and stout, 0.3–2.5 m. high; *leaves entire, lanceolate*, slightly clasping; *the lower ones* lanceolate-oblong, 1.5–6 *dm. long*, obscurely triple-nerved; the uppermost 4–15 cm. long; racemes short, in an open or contracted panicle; *involucre* 4–6 *mm. long, many-flowered;* rays showy 7–10. — Salt marshes, or rocks on the shore, Gulf of St. Lawrence, and southw., Aug.-Nov. (rarely Dec.). — Varies, in less brackish swamps, to forms with thinner elongated linear-lanceolate leaves tapering to each end, and more erect racemes in a more slender panicle.

b. Leaves not fleshy; plants not maritime.

1. *Basal leaves long-petioled, conspicuously larger than the* 10–30 (–40) *remote or subremote cauline ones.*

o *Stems strongly angled; leaves shagreen-scabrous on the upper surface; heads* 15–20-*flowered.*

22. **S. pátula** Muhl. *Stem sharply* 4-*angled, smooth*, 0.5–2 m. high; *lower leaves* 1–4 dm. long, *ovate*, acute, serrate, pale, *very smooth and veiny underneath*, but the *upper surface very rough*, like shagreen; uppermost leaves lanceolate, 2–5 cm. long; racemes rather short and numerous on the leafy-bracted spreading branches; heads rather large and full; the involucre 3–4.5 mm. long, nearly as broad, its linear-oblong bracts obtuse. — Bogs and swamps, chiefly in calcareous regions, w. Me. to Ont., and southw. Aug., Sept.

o o *Stems terete or nearly so; leaves smooth or smoothish (rarely scabrous); heads* 6–15(–20)-*flowered.*

+ *Leaves mostly serrate, the lower and middle cauline (as well as the basal) rather abruptly narrowed to the petiolar base.* (Extreme forms of *S. ulmifolia* might be sought here.)

23. **S. argùta** Ait. *Smooth;* stem 6–15 dm. high, obscurely angled above; *leaves* usually *thin, sharply double-serrate; the lower ovate or ovate-lanceolate*, 1.5–4 *dm. long, pointed at both ends*, their petioles margined; the upper elliptical-lanceolate, 3–9 dm. long; *racemes pubescent, spreading, disposed in an elongate open panicle; involucre* about 4 mm. long, its *thin bracts* bluntish; *rays* 6–7, *large; achenes glabrous.* — Open woods and thickets, w. Me. to Ont., and southw. Aug., Sept.

24. **S. Boóttii** Hook. Smooth, or scabrous-pubescent or below hirsute, slender, often branched, 0.5–1.5 m. high; *leaves rather finely serrate*, ovate to oblong-lanceolate, pointed; *the lower* 6–15 *cm. long;* the upper small, oblong to narrowly lanceolate, often entire; heads loosely racemose at the tips of the very

few elongate leafy-bracted branches; *rays* 1–5 *or none; achenes pubescent.* — Dry grounds, Va. to Fla. and Tex., northw. in Miss. basin to Mo. July–Sept.

+ + *Leaves all tapering gradually to the base, the uppermost chiefly entire.*

× *Panicle usually as broad as high; rays* 8–12.

25. **S. júncea** Ait. *Smooth throughout*, 5–12 dm. high; *radical and lower stem-leaves* 1.5–4 dm. long, *elliptical or lanceolate-oval, sharply serrate* with spreading teeth, *pointed*, tapering into winged and ciliate petioles; *the others lanceolate or narrowly oblong*, slightly triple-nerved, tapering to each end, the *uppermost entire*, 3–6 cm. long; *racemes dense, naked, at length elongated and recurved, forming a crowded corymb-like panicle;* involucre 2.5–4 mm. long, its *closely appressed rigid pale oblong bracts* blunt or acutish. — Dry copses and banks, N. B. to Sask., s. to N. C., and Mo. Late June–Sept. Var. SCABRÉLL (T. & G.) Gray. Foliage scabrous. — Vt. to Ky., and westw.

Var. **ramòsa** Porter & Britton. The numerous branches upright, only slightly secund, with short terminal racemes. — N. J. to W. Va. and O.

× × *Panicle usually longer than broad; rays* 2–8.

26. **S. neglécta** T. & G. Smooth; stem stout, 6–15 dm. high, rather leafy; *leaves* thickish, smooth both sides, opaque; *the cauline* 20–40; *the upper oblong-lanceolate*, mostly acute and nearly entire; the uppermost 2–5 cm. long; the *lower ovate-lanceolate or oblong*, sharply serrate, 2–4 dm. long, 3–8 *cm. broad*, tapering into a petiole; *racemes short and dense*, at first erect and scarcely 1-sided, *at length spreading*, disposed in an elongated or pyramidal close panicle; involucre 3–4.5 mm. long, its blunt *bracts subherbaceous; rays* 3–8; peduncles and achenes nearly glabrous. — Swamps, brook-sides, and prairies, e. Mass. and Vt. to Md., Ill., and Wisc. Aug.–early Oct.

27. **S. uniligulàta** (DC.) Porter. Smooth; stem slender, 1.5–9 dm. high; *leaves* thick, opaque; *the cauline* 5–20 (rarely 30), *linear or linear-lanceolate*, appressed-ascending; *the lower narrowly lanceolate or oblanceolate*, appressed-serrate, 1–3 dm. long, 0.7–3 *cm. broad*, tapering to a long petiole; panicle much as in no. 26, but smaller; involucre 3.5–5 mm. long, its *pale straw-colored bracts chartaceous; rays* 2–5. (*S. neglecta*, var. *linoides* Gray.) — Sphagnum bogs and mossy banks, Nfd. to Ont., s. to N. J., Pa., and Ill. July–Sept.

2. *Basal leaves similar to the* 30–100 (–200) *ordinarily almost uniform or gradually reduced approximate cauline ones.*

o *Leaves all (or all but the lower) entire, with prominent midrib but obscure veins.*

+ *Stem glabrous or merely puberulent; leaves linear or linear-lanceolate.*

28. **S. odòra** Ait. (SWEET GOLDEN-ROD.) *Smooth* or nearly so throughout; *stem slender*, 0.5–1 m. high, *often reclined; leaves linear-lanceolate, entire*, shining, *pellucid-dotted, the middle ones* 6–10 *cm. long;* racemes spreading, in a small one-sided panicle; involucre 3–5 mm. long, the few inner yellowish bracts much longer than the outer; rays 3–4, rather large. — Borders of thickets in dry or sandy soil, s. N. H. and s. Vt. to Fla., w. to Mo. and Tex. July–Sept. — The crushed leaves yield a pleasant anisate odor; but an occasional form is nearly scentless.

29. **S. tortifòlia** Ell. *Stem scabrous-puberulent*, 5–9 dm. high; *leaves* linear, short (*the middle ones* 1.5–5 *cm. long*), *commonly twisted*, roughish-puberulent or glabrate, *often as many as* 200; panicle of numerous slender recurved racemes; involucre 2.5–3.5 mm. long, the obtuse scales pale straw-color; rays very short. — Dry soil, coast of Va. to Fla. and Tex. Sept., Oct.

+ + *Stem hirsute; leaves oblong.*

30. **S. fistulòsa** Mill. *Stem stout, upright*, 0.9–2 m. high, *clothed with spreading hairs; leaves oblong-lanceolate, roughish, hairy beneath*, at least on the midrib, serrulate, the upper ovate-lanceolate or oblong and entire, closely sessile; racemes many, recurved, in a dense pyramidal panicle; rays 7–10, very

short. (*S. pilosa* Walt.) — Low grounds, pine barrens of N. J. to Va., and southw. Aug.–Oct.

o o *Leaves all or nearly all toothed, the veins prominent.*

+ *Stems glabrous; leaves oblong-lanceolate to elliptic-ovate.*

× *Branches of the crowded ellipsoid to pyramidal panicle floriferous nearly throughout, ascending or ascending-spreading.*

31. **S. Ellióttii** T. & G. *Smooth;* stem stout, 0.5–1.8 m. high, *very leafy; leaves elliptical or oblong-lanceolate*, acute, 0.5–1 dm. long, closely sessile, slightly serrate, strongly veined, *thick, smooth both sides, shining above; heads in dense slightly spreading racemes which are crowded in a close pyramidal panicle;* involucre 4–5 mm. long; peduncles and achenes strigose-pubescent; rays 8–12. — Swamps (fresh or brackish) near the coast, Mass. to N. J., and southw. Sept., Oct.

× × *Longer branches of the loose panicle chiefly flowerless at base, strongly recurved-spreading.*

32. **S. ulmifòlia** Muhl. *Stem smooth*, slender, 5–15 dm. high, the branches hairy; *leaves thin, elliptical-ovate or oblong-lanceolate*, pointed, *tapering to the base*, loosely veined, usually beset with soft hairs beneath; racemes panicled, loosely recurved-spreading; involucre 3–4 mm. long, its bracts lanceolate-oblong; rays about 4. — Dry or rocky woods and copses, N. S. and s. Me. to Minn., and southw. Aug., Sept.

+ + *Stems pubescent (or glabrous only in var. of no. 33, which has lanceolate leaves and strongly recurved panicle-branches).*

33. **S. rugòsa** Mill. *Stem villous or villous-hirsute* with long sordid hairs, 0.5–2 m. high; *leaves* crowded, *lanceolate or ovate-lanceolate, narrowed at base, mostly sharp-serrate*, pubescent (especially beneath), *thin and loosely veiny, not conspicuously rugose;* racemes spreading in a broad pyramidal panicle, all much exceeding the subtending leaves; involucre 3–4 mm. long, its bracts linear; rays 6–9; disk-flowers 4–7. (*S. altissima* of auth., not L.) — Damp thickets and borders of fields, Nfd. to w. Ont., and southw. Aug., Sept. Var. SPHAGNÓPHILA Graves. Stems and leaves glabrous. — Wet shores and mossy swamps, e. Mass. to Ct.

Var. **villòsa** (Pursh) Fernald. Panicle elongate, most of the racemes nearly equaled or even exceeded by the large subtending leaves. — The common extreme from Lab. and w. Nfd. to w. Que. and n. Me.

× **S. aspérula** Desf. Smooth below, somewhat rough-pubescent above; stem stout, 7–14 dm. high, very leafy; leaves thick and slightly veiny, lanceolate or elliptic, scabrous or rarely glabrous, the lower 1–2 dm. long; racemes, etc., intermediate between those of nos. 21 and 33. — Dryish borders of salt marshes, Me. to Ct.; apparently a hybrid of the preceding species and no. 21, more widely distributed than most such plants of this genus.

34. **S. áspera** Ait. *Stem scabrous-puberulent or short-hispid; leaves ovate, oblong, or ovate-lanceolate, rounded at base, appressed-serrate, very scabrous* on both surfaces, *thick and strongly rugose;* inflorescence much as in no. 33, but the elongate racemes mostly forming a more slender panicle. (*S. rugosa* Man. ed. 6, in part.) — Dry woods and fields, rarely in meadows, e. Mass. and O. to Fla. and Tex. Aug.–Oct.

— — *Leaves more or less plainly 3-ribbed, 2 of the lower veins becoming prominent and elongated parallel with the midrib; heads in 1-sided chiefly spreading or recurved racemes, forming an ample panicle; not maritime.*

= *Branches of the panicle glabrous.*

35. **S. missouriénsis** Nutt. Smooth throughout, 2.5–10 dm. high; *leaves firm and rigid, linear-lanceolate*, or the lower broadly lanceolate, tapering to both ends, with very rough margins, *commonly bearing axillary fascicles;* teeth, if any, sharp and rigid; *heads and dense crowded recurved racemes* nearly as in no. 25; involucre 3–5 mm. long, its very unequal thickish straw-colored bracts

blunt; rays 6–13, small; *achenes nearly glabrous.* — Dry prairies and open woods, Tenn. to Man., and westw. July–Sept.

36. **S. Gattingèri** Chapm. Slender and strict, 4–10 dm. high; stems smooth throughout; *leaves* ciliolate, smooth beneath, harsh above, the lowest 0.7–1.5 dm. long, lance-spatulate, appressed-serrulate or subentire, *the upper reduced rapidly to minute entire bracts with naked axils; branches of the naked subcorymbiform panicle elongate and ascending, hardly recurved;* involucre 3–4 mm. long, its oblong bracts obtuse; rays 6–10; *achenes appressed-puberulent,* or glabrate below. — Limestone hills and barrens, Tenn. and Mo. July–Sept.

= = *Branches of the panicle pubescent.*

a. Leaves firm and often rigid, the lower usually elongated and many times exceeding the reduced upper ones (except in no. 39); *involucral bracts thick and rigid.*

1. *Lower portion of the stem and the leaves essentially glabrous.*

37. **S. Shórtii** T. & G. Stem slender, simple, 0.5–1.2 m. high, minutely roughish-pubescent above; *leaves* (the larger 0.5–1 dm. long) *oblong-lanceolate,* acute, the lower mostly serrate with a few fine teeth; racemes recurved, usually in a crowded panicle; *involucre slender,* 4–6 *mm. long; achenes silky-pubescent.* — Rocks at the Falls of the O.

2. *Stem and leaves pubescent.*

o *Stems and leaves ashy or whitish with close puberulence.*

38. **S. nemoràlis** Ait. Clothed with minute *grayish-hoary* soft or roughish pubescence; stem simple or corymbed above, 1.5–7.5 dm. high; *leaves oblanceolate or spatulate-oblong,* mostly subtending axillary fascicles; *the lower long-petioled,* usually crenate-toothed, 5–15 *cm. long; the uppermost greatly reduced,* 1–3 cm. long; *racemes* numerous, dense, *at length recurved,* and ordinarily *forming a crowded compound raceme or panicle which is turned to one side;* involucre 3.5–6 mm. long, its firm yellowish bracts linear-oblong, appressed; rays 5–9, bright yellow. — Dry open soil (rarely in woods), P. E. I. to the Saskatchewan, and southw. July–Nov. (rarely Dec.).

39. **S. móllis** Bartl. Stout, *rigid, canescent;* the stems 1.5–5 dm. high, solitary or clustered from a *freely stoloniferous subligneous base; leaves rigid, oval or oblong,* obtuse or rarely acutish, *gradually reduced upward,* the uppermost 1–3 cm. long, *the lower* 3–8 *cm. long; racemes ascending in a dense thyrse;* involucre 4–6 mm. long, greenish-yellow. (*S. nemoralis,* var. *incana* Gray.) — Dry hills and plains, Man. and Minn., westw. and southw. July–Sept. (Mex.)

o o *Stems and leaves green.*

40. **S. rádula** Nutt. Stem and *oblong or obovate-spatulate leaves rigid and very rough, not hoary,* the upper leaves sessile; bracts oblong, rigid; rays 3–6; otherwise nearly as in no. 39. — Limestone bluffs and dry open soil, s. w. Ill. to w. La. and Tex. Aug.–Oct.

b. Leaves thinner, essentially uniform from base to summit of the stem; involucral bracts thin.

1. *Leaves elongate, linear to lance-oblong.*

o *Involucre* 2–2.8 *mm. long.*

41. **S. canadénsis** L. *Stem* rather slender, 0.3–1.5 m. high, *glabrous at least below,* often minutely pubescent above; *leaves narrowly lanceolate, thin, glabrous above, minutely pubescent on the nerves beneath,* mostly *sharp-serrate,* the middle ones 6–13 cm. long, 5–18 mm. wide; heads tiny, crowded in recurved racemes and forming *dense broadly pyramidal panicles; pedicels strongly pilose;* involucral bracts linear, mostly attenuate, greenish-straw-color. (Var. *glabrata* Porter.) — Thickets and rich open soil, Nfd. to N. Dak., s. to W. Va. and Ky. July–Sept.

Var. **gilvocanéscens** Rydb. Stems and leaves cinereous or canescent with minute puberulence; leaves broadly lanceolate to lance-oblong, the middle ones

4–7 cm. long, 1–2 cm. broad. — Dry or sterile situations, Gaspé Co., Que.; and from Ill. to Man., Kan., and westw.

42. S. **rupéstris** Raf. Stem smooth, slender, 5–10 dm. high; *leaves* linear-lanceolate, tapering both ways, *entire or nearly so, glabrous upon both surfaces; racemes ascending, scarcely recurved, forming somewhat open or elongate panicles; pedicels slightly pilose or glabrate.* — Rocky river-banks, W. Va., Ky., and Ind. Aug., Sept. — Too near the preceding, of which it may be a variety.

o o *Involucre 3.2–5 mm. long.*

\+ *Stem closely and minutely pubescent throughout.*

43. S. **altíssima** L. *Stem cinereous-puberulent*, stout, 0.7–2 m. high; *leaves thickish*, lanceolate, subentire or more or less toothed, minutely pubescent or scabrous above, *short-pilose beneath*, the middle ones 6–13 cm. long, 10–18 mm. broad; heads crowded in recurved racemes forming dense high broadly pyramidal panicles; *involucre 3.2–4.5 mm. long*, its subherbaceous bracts linear. (*S. canadensis* Man. ed. 6, in part, including var. *scabra* T. & G.) — Rich open ground, Aroostook valley, Me.; Mass. and Vt. to Mich., Kan., and southw. Aug.–Oct.

Var. **prócera** (Ait.) Fernald. Stem and lower surface of the leaves more loosely pubescent with distinct soft hairs; branches of the panicle strongly ascending, scarcely if at all recurved at tip. (*S. procera* Ait.; *S. canadensis*, var. T. & G.) — A little known extreme, apparently best developed in the L. Superior region. — In inflorescence simulating *S. elongata* Nutt. of the Northwest and of the lower St. Lawrence, which has glabrous or glabrate stems and leaves, and less herbaceous involucre.

\+ + *Stem glabrous throughout (or except in the inflorescence).*

44. S. **serótina** Ait. *Stem* stout, 0.5–2.5 m. high, *smooth, often glaucous; leaves quite smooth both sides*, lanceolate to oblanceolate, taper-pointed, very sharply serrate, except the narrowed base, rough-ciliate; the middle ones 7–16 cm. long, 1–3 cm. wide; the ample panicle pubescent; involucre 3.5–5 mm. long, its bracts linear, subherbaceous; *rays 7–14, rather long.* — Thickets, in rich soil, N. B. to B. C., and southw. July–Sept.

Var. **gigantèa** (Ait.) Gray. Leaves glabrous above, slightly pubescent beneath, especially on the nerves; involucre 3.2–4 mm. long. — Low ground, e. Que. to Ill., and southw.

2. *Leaves broad-elliptic or -ovate.*

45. S. **Drummóndii** T. & G. *Stem* (3–9 dm. high) *and lower surface of the broadly ovate or oval somewhat triple-ribbed leaves minutely velvety-pubescent*, some of the leaves almost entire; racemes panicled; bracts of the involucre oblong, obtuse; rays 4 or 5. — Limestone cliffs and rocky woods, s. w. Ill. and Mo. to La. Sept., Oct.

\+ + + + *Heads in a compound corymb terminating the simple stem, not at all racemose; leaves mostly with a strong midrib.*

\+ *Leaves flat, not 3-nerved.*

46. S. **rígida** L. *Rough and somewhat hoary* with a minute pubescence; stem stout, 0.3–1.5 m. high, very leafy; *leaves oval or oblong*, copiously feather-veined, thick and rigid, the basal 1–3 dm. long, petioled; the upper closely sessile by a broad base, slightly serrate, the uppermost entire; corymb dense; *heads more than 30-flowered; the involucre 6–8 mm. long;* rays 7–10. — Dry soil, Mass. to Man., and southw. Aug.–Oct.

47. S. **ohioénsis** Riddell. *Very smooth* throughout; stem wand-like, slender, leafy, 6–9 dm. high; *stem-leaves oblong-lanceolate, flat*, entire, rough-margined, obscurely feather-veined, closely sessile, the upper only 3–4 cm. long; the lower and radical ones elongated, 3 dm. long, slightly serrate toward the apex, tapering into long margined petioles; *heads* numerous, on smooth pedicels, *16–20-flowered; the involucre 4.5–6 mm. long;* rays 6 or 7. — Swamps and wet prairies, Ont. and w. N. Y. to Ind. and Wisc. Aug., Sept.

↔ ↔ *Leaves somewhat folded, entire, the lower slightly 3-nerved.*

48. **S. Riddéllii** Frank. *Smooth and stout*, 0.5–1 m. high, *very leafy*, the branches of the dense corymb and pedicels rough-pubescent; *leaves linear-lanceolate, the cauline elongated* (1–1.5 dm. long), acute, partly clasping or sheathing, *mostly recurved*, the lowest elongated-lanceolate (3–5 dm. long) and tapering into a long keeled petiole; *heads very numerous*, clustered, 20–30-flowered; rays 7–9. — Wet grassy prairies, Ont. to Minn. and Mo.; Ft. Monroe, Va. Aug., Sept. — Heads larger than in the preceding.

49. **S. Houghtònii** T. & G. *Smooth; stem rather low and slender*, 3–6 dm. high; *leaves scattered, linear-lanceolate, acutish*, rough-margined, 0.5–1.3 dm. long, 5–10 mm. wide, tapering into a narrowed slightly clasping base, 1-nerved, or the lower 3-nerved and with margined petioles; veins obscure; *heads few or several*, 20–30-flowered; involucre 6–8 mm. long, with obtuse bracts; rays 7–9. — Swamps, north shores of Lakes Michigan and Huron; Genesee Co., N. Y. July, Aug.

§ 2. EUTHÀMIA Nutt. *Corymbosely much branched; heads small, sessile or subsessile, in little clusters crowded in flat-topped corymbs; the closely appressed involucral bracts somewhat glutinous; receptacle fimbrillate; rays 6–20, short, more numerous than the disk-flowers; leaves narrow, entire, sessile.*

* *Leaves distinctly 3–5-ribbed; heads 20–30-flowered.*

← *Involucre 4–5 mm. long, the bracts usually without conspicuous tips.*

50. **S. graminifòlia** (L.) Salisb. Stem 5–10 dm. high, glabrous; leaves lance-linear, the primary ones 5–13 cm. long, 4–9 mm. broad, glabrous except for the scabrous margins and the minutely pubescent nerves beneath; branches of the inflorescence glabrous or at most minutely serrulate on the angles; *leafy bracts of the inflorescence ascending; heads obovoid-cylindric, sessile*, in dense corymbed glomerules; *involucral bracts straw-color or yellowish-green, their tips rarely darker, the outermost ovate or oblong.* (*Euthamia* Nutt.; *S. lanceolata* Man. ed. 6, and perhaps L.) — Moist soil, e. Que. to Sask., s. to N. J., Ill., Mo., and along the mts. to N. C. Aug.-Oct.

Var. **Nuttállii** (Greene) Fernald. Leaves more pubescent; branches of the inflorescence hirtellous. — N. S. to Mich. and Ala.

← ← *Involucre 3–3.5 mm. long, the bracts with conspicuous green tips.*

51. **S. polycéphala** Fernald. Similar to the preceding variety; leaves elongate, thin, puberulous; *branches of the corymb very hirtellous, their small bracts wide-spreading or deflexed; involucre turbinate, very small, its somewhat puberulent bracts with closely appressed deltoid green tips.* — Apparently local, s. N. J. and e. Pa. Aug., Sept.

* * *Leaves 1-ribbed or obscurely 3-nerved; heads 12–20(rarely 22)-flowered.*

← *Leaves almost acicular, the middle cauline 1–1.5 mm. wide.*

52. **S. mìnor** (Michx.) Fernald. Very slender, 4–8 dm. high, the glabrous stem freely fastigiate-branched above the middle; *leaves extremely slender*, the primary ones 3–5 cm. long, acerose-tipped, 1-*ribbed, punctate, commonly subtending axillary fascicles as do many of the rameal ones; heads mostly short-pediceled*, in numerous small corymbs; *involucre nearly cylindric, acute at base, 3–4 mm. long, 1–1.5 mm. thick*, its firm appressed glutinous straw-colored bracts with slightly green acutish tips. (*S. tenuifolia* Pursh, in part.) — Sandy soil, near the coast, Va. to Fla. and Ala. Sept., Oct.

← ← *Leaves flat, broader, 2–6 mm. wide.*

↔ *Involucre 3–4 mm. long.*

53. **S. tenuifòlia** Pursh. Rather slender, 3–9 dm. high, the glabrous stem freely fastigiate-branched above the middle; *leaves linear or linear-lanceolate*, soon spreading or reflexed; *the primary ones 4–7 cm. long, 2–4 mm. broad, taper-pointed*, 1-ribbed, often obscurely 2-nerved, minutely punctate, *usually*

subtending axillary fascicles; rameal leaves smaller, usually without axillary fascicles; heads mostly in glomerules, a few pediceled, the pedicels smooth or scabrous; *involucre campanulate*, 3–4 mm. long, 2–3 *mm. thick*, its *firm oblong glutinous bracts* blunt. (*Euthamia* Greene; *E. caroliniana* Am. auth., in part, not Greene.) — Sandy or gravelly soil, chiefly near the coast, e. Mass. to Fla.; also n. Ind. to s. Wisc. Aug.–Oct.

54. S. Moselèyi Fernald. Similar, 5–6 dm. high; *leaves* lance-linear, taper-pointed, *without axillary fascicles; heads mostly on* scabrous *pedicels subtended by very minute subulate bracts; involucre subcylindric*, 3–4 mm. long, 1.5–2 *mm. thick, its* very unequal *soft bracts linear.* — Oxford Prairie, Erie Co., O. (*Moseley*). Sept.

↔ ↔ *Involucre* 5–6 *mm. long.*

55. S. leptocéphala T. & G. *Stem* strict and *simple nearly to the summit*, 3–6 dm. high; *leaves linear-lanceolate*, firm, light green, strongly 1-ribbed, with or without obscure lateral nerves, somewhat punctate but *not viscid, the middle ones* 4–6 cm. long, 4–6 *mm. wide;* heads sessile or short-pediceled; *involucre* cylindric-clavate, its linear pale straw-colored bracts *barely viscid.* (*Euthamia* Greene.) — Damp sandy ground, e. Neb. to Miss. and Tex. Aug.–Oct.

56. S. gymnospermoìdes (Greene) Fernald. Similar, *freely fastigiate-branched from near the middle; leaves linear-attenuate*, 1-ribbed, strongly punctate, *glutinous; the middle ones* 5–7 cm. long, 2–3 *mm. wide; involucre very viscid.* (*Euthamia* Greene.) — Dry soil, e. Kan. to La. and Tex. Aug.–Oct.

16. BRACHYCHAÈTA T. & G. False Golden-rod

Habit and flowers nearly as in *Solidago*, except as to the pappus, which is a row of minute rather scale-like bristles, shorter than the achene. — A perennial herb, with rounded or ovate serrate leaves, all the lower ones heart-shaped; the small yellow heads in sessile clusters racemed or spiked on the branches. (Name composed of βραχύς, *short*, and χαίτη, *bristle*, from the pappus.)

1. B. sphacelàta (Raf.) Britton. Slender, about 1 m. high. (*B. cordata* T. & G.) — Wooded hills, s. Ind. to Va. and Ga. Aug.–Oct.

17. APLOPÁPPUS Cass.

Heads many-flowered, radiate; rays many, pistillate. Involucre hemispherical, of many closely imbricated bracts in several series. Receptacle flat. Achenes short, turbinate to linear; pappus simple, of numerous unequal bristles. — Mostly herbaceous perennials, with alternate rigid leaves. Ray- and disk-flowers both yellow. (From ἁπλόος, *simple*, and πάππος, *pappus*.)

1. A. ciliàtus (Nutt.) DC. *Annual or biennial*, glabrous, 0.5–1.5 m. high, leafy; *leaves oval* (or the lower obovate), obtuse, *dentate* with bristle-pointed teeth; heads very large, few and clustered, the outer bracts spreading; achenes glabrous, the central abortive. (*Prionopsis* Nutt.) — Mo., Kan., and southw.

2. A. spinulòsus (Pursh) DC. *Perennial*, branching, puberulent or glabrate, low; *leaves narrow, pinnately or bipinnately parted*, the lobes and teeth bristle-tipped; heads small, the appressed bracts bristle-tipped; achenes pubescent. (*Sideranthus* Sweet; *Eriocarpum* Greene.) — Minn. and Ia. to the Saskatchewan and Tex.

18. BIGELÒWIA DC. Rayless Golden-rod

Heads 3–4-flowered; flowers all tubular and perfect. Involucre club-shaped, yellowish; the rigid somewhat glutinous bracts linear, closely imbricated and appressed. Receptacle narrow, with an awl-shaped prolongation in the center. Achenes somewhat obconical, hairy; pappus a single row of capillary bristles. — Flowers yellow. Leaves scattered, oblanceolate or linear, 1–3-nerved. A large chiefly western genus, few species approaching our limits. (Dedicated to *Dr. Jacob Bigelow*, author of the Florula Bostoniensis, and of the American Medical Botany.) Chondrophora Raf. Bigelovia T. & G.

1. **B. nudàta** (Michx.) DC. A smooth perennial; the slender stem 3–8 dm. high, simple or branched from the base, naked above, bearing small heads in a flat-topped corymb. — Low pine barrens, N. J., and southw. Sept.

19. BÉLLIS [Tourn.] L. Daisy

Heads many-flowered; the rays numerous, pistillate. Bracts of the involucre herbaceous, equal, in about 2 rows. Receptacle conical, naked. Achenes obovate, flattened, wingless, and without any pappus. — Low herbs, chiefly of the Old World, either stemless, like the true *Daisy*, B. perénnis L. (which is found as an occasional escape from cultivation), or leafy-stemmed, as is the following. (The Latin name, of uncertain derivation.)

1. **B. integrifòlia** Michx. (Western D.) Annual or biennial, diffusely branched, 1–4 dm. high, smoothish; leaves lanceolate or oblong, the lower spatulate-obovate; heads on slender peduncles; rays pale violet-purple. — Prairies and banks, Ky., and southwestw. May, June.

20. CHAETOPÁPPA DC.

Heads several-flowered, radiate; disk-flowers often sterile. Involucral bracts imbricated in 2 or more rows, the outer shorter. Receptacle flat, naked. Achenes fusiform or compressed; pappus of 5 or fewer thin nerveless scales, alternating with rough bristly awns, or these wanting. — Low southwestern branching annuals, with narrow entire leaves and solitary terminal heads; rays white or purple. (*Χαίτη, a bristle*, and *πάππος, pappus.*)

1. **C. asteroìdes** DC. Slender, 0.5–3 dm. high, pubescent; involucres slender, 4 mm. long; rays 5–12; achenes pubescent. — Dry grounds, Mo., and southwestw.

21. BOLTÒNIA L'Hér.

Heads many-flowered; rays numerous, pistillate. Bracts of the hemispherical involucre imbricated somewhat in 2 rows, appressed, with narrow membranaceous margins. Receptacle conical or hemispherical, naked. Achenes very flat, obovate or inversely heart-shaped, margined with a callous wing, or in the ray 3-winged, crowned with a pappus of several minute bristles and usually 2–4 longer awns. — Perennial bushy-branched smooth herbs, pale green, with the aspect of *Aster;* the thickish leaves chiefly entire, often turned edgewise. Flowers autumnal; disk yellow; rays white or purplish. (Dedicated to *James Bolton*, English botanist of the 18th century.)

* *Heads middle-sized, loosely corymbed.*

1. **B. asteroìdes** (L.) L'Hér. Stems 0.2–2.5 m. high; leaves lanceolate; involucral bracts acuminate; pappus of few or many minute bristles and 2 awns or none. — Moist places along streams, Ct. to Neb., and southw. Aug.–Oct. Var. decúrrens (T. & G.) Engelm. A large form with the leaves alate-decurrent upon the stem and branches. (*B. decurrens* Wood.) — Ill. and Mo.

2. **B. latisquàma** Gray. Heads rather larger; involucral bracts oblong to ovate, obtuse or mucronate-apiculate; pappus-awns conspicuous. — Prairies, etc., w. Mo., Kan., and Okla.

* * *Heads small, panicled on the slender branches.*

3. **B. diffùsa** Ell. Stem diffusely branched; leaves lance-linear, those on the branchlets very small and awl-shaped; rays short, mostly white; pappus of several very short bristles and 2 short awns. — Prairies, etc., s. Ill. to Fla. and Tex. Aug.–Oct.

22. ÁSTER [Tourn.] L. Starwort. Frost-flower. Aster

Heads many-flowered, radiate; the ray-flowers in a single series, fertile. Bracts of the involucre more or less imbricated, usually with herbaceous or leaf-

like tips. Receptacle flat, alveolate. Achenes more or less flattened; pappus simple, of capillary bristles (double in §§ 4 and 5). — Perennial herbs (annual only in §§ 7 and 8), with corymbed, panicled, or racemose heads, flowering chiefly in autumn. Rays white, purple, blue, or pink; the disk yellow, often changing to purple. Species often without sharply defined limits, freely hybridizing. (Name ἀστήρ, *a star*, from the radiate heads of flowers.)

N.B. — In this genus the heads are drawn on a scale of $\frac{2}{3}$, the leaves $\frac{1}{2}$.

A. At least the basal leaves cordate and definitely petioled *B.*
  B. Stem-leaves petioled or sessile, not clasping *C.*
    C. Rays white *D.*
      D. Plant not glandular *E.*
        E. Heads corymbose.
          Involucre ovoid-campanulate, thick-cylindric, or turbinate; tufted basal leaves few or none.
            Leaves thin, smoothish, at least not rough above . . 2. *A. divaricatus.*
            Leaves thick, rough above.
              Inflorescence slightly forking; heads few, 1–1.5 cm. high 3. *A. furcatus.*
              Inflorescence much branched; heads numerous, hardly 1 cm. high . . . . . 4. *A. glomeratus.*
          Involucre slender, cylindric; large tufted basal leaves abundant . . . . . 5. *A. Schreberi.*
        E. Heads paniculate . . . . . 23. *A. cordifolius.*
      D. Glandular, at least as to the branches of the inflorescence . . 6. *A. macrophyllus.*
    C. Rays blue or violet *F.*
      F. Plant not glandular *G.*
        G. Involucral bracts with squarrose tips; rays many (about 40) . 19. *A. anomalus.*
        G. Involucral bracts appressed or ascending; rays fewer (10–20) *H.*
          H. Leaves entire or essentially so, firm, much longer than wide.
            Leaves harsh above . . . . . 20. *A. azureus.*
            Leaves smooth above . . . . . 21. *A. Shortii.*
          H. Leaves serrate, mostly thinner *I.*
            I. Involucre 4–6 mm. high; bracts appressed, with conspicuous colored tips; heads abundant, paniculate.
              Cordate leaves mostly on slender petioles, neither glaucous nor very smooth . . . . . 23. *A. cordifolius.*
              Cordate leaves mostly on winged petioles, glaucous beneath, smooth . . . . . 24. *A. Lowrieanus.*
            I. Involucre 6–10 mm. high; bracts loose, without conspicuously colored tips.
              Heads abundant, densely racemo-paniculate.
                Stem essentially glabrous . . . . . 25. *A. sagittifolius.*
                Stem densely short-pubescent . . . . . 26. *A. Drummondii.*
              Heads fewer, loosely paniculate or subcorymbose . . 27. *A. Lindleyanus.*
      F. At least the branches of the inflorescence glandular . . . 6. *A. macrophyllus.*
  B. Stem-leaves mostly cordate-clasping . . . . . 22. *A. undulatus.*
A. None of the leaves at once cordate and definitely petioled *J.*
  J. At least the lower leaves abruptly narrowed or constricted below the middle.
    Leaves essentially entire, at most slightly constricted above the base . . . . . 18. *A. patens.*
    Leaves sharply serrate, the lower contracted to winged petioles.
      Leaves with abruptly dilated auriculate-clasping bases . . 48. *A. prenanthoides.*
      Leaves without dilated bases, scarcely clasping . . . . 47. *A. tardiflorus.*
  J. Leaves not abruptly narrowed or constricted below *K.*
    K. Stem-leaves with cordate- or auriculate-clasping bases *L.*
      L. Involucre glandular-hairy; rays usually deep violet *M.*
        M. Leaves conspicuously cordate-clasping, mostly entire.
          Branchlets glandular-viscid; involucre hemispherical; bracts subequal, linear-attenuate, loose . . . . . 14. *A. novae-angliae.*
          Branchlets not glandular; involucre turbinate; bracts unequal, linear-oblong, with slightly spreading green tips . 18. *A. patens.*
        M. Leaves obscurely cordate-clasping.
          Plant rigid, freely branching; leaves mucronate-tipped; involucral bracts unequal, linear or linear-oblong, with spreading tips . . . . . 13. *A. oblongifolius.*
          Plant not rigid, bearing few terminal heads; leaves thin, acuminate; bracts equal, linear-attenuate . . . 15. *A. modestus.*
      L. Involucre not glandular-hairy *N.*
        N. Bracts of the involucre distinctly imbricated, *i.e.* the outer series successively shorter *O.*
          O. Plant smooth and glaucous.
            Leaves lanceolate to ovate; heads paniculate . . . 29. *A. laevis.*
            Leaves narrower; heads solitary or racemose . . . 30. *A. virgatus.*
          O. Plant not glaucous.
            Tips of bracts squarrose or recurved-spreading.

Plant cinereous-pubescent, with small leaves (5 cm. or less long); heads 6 mm. high . . . . . 35. *A. amethystinus*
Plant green and essentially glabrous; leaves and heads larger; bracts herbaceous, the outer often foliaceous 46. *A. novi-belgii.*
Tips of bracts ascending, not recurved.
Bracts linear-oblong or lanceolate, firm, with dilated herbaceous tips; rays deep blue or violet.
Leaves conspicuously clasping, the auricles generally meeting around the stem . . . . . 18. *A. patens.*
Leaves slightly or inconspicuously clasping . . . 31. *A. concinnus.*
Bracts linear-attenuate, thin, with slender green or colored tips; rays white or lavender . . . . . 42. *A. paniculatus.*
N. Bracts of the involucre essentially equal, only the very outermost sometimes broader and shorter.
Tips of bracts acute (not attenuate), recurved-spreading or squarrose . . . . . 46. *A. novi-belgii.*
Tips of bracts (except occasional outer foliaceous ones) long-attenuate, ascending, not recurved.
Stem slender, glabrous or villous; leaves long-lanceolate; involucre 5–8 mm. high . . . . . 45. *A. longifolius.*
Stem stout, glabrous or harshly pubescent; leaves lanceolate to narrowly rhombic-obovate; involucre 7–12 mm. high . . . . . 49. *A. puniceus.*
K. Stem-leaves narrowed or rounded or cordate at base, but not clasping *P.*
P. Leaves silvery-silky on both faces, entire.
Heads solitary or few at the tips of the branches; achenes smooth . . . . . 16. *A. sericeus.*
Heads in a wand-like raceme; achenes silky . . . . . 17. *A. concolor.*
P. Leaves green, not silvery-silky, sometimes pilose or villous *Q.*
Q. Involucre glandular-viscid; rays violet *R.*
R. Basal leaves petioled, much larger than the cauline.
Basal leaves ovate or ovate-oblong, on nearly naked petioles; involucral bracts erect . . . . . 7. *A. Herveyi.*
Basal leaves narrower, on margined petioles; involucre squarrose.
Tall; basal leaves spatulate- to lance-oblong; involucre 1–1.5 cm. high, very glandular . . . . . 8. *A. spectabilis.*
Low; basal leaves lanceolate; involucre mostly shorter, barely glandular . . . . . 9. *A. surculosus.*
R. Basal and stem-leaves uniform, linear to oblong, the lower not conspicuously petioled.
Leaves firm, linear- to lance-oblong, entire, blunt or acutish.
Stem hispid; uppermost leaves passing into involucral bracts . . . . . 12. *A. grandiflorus.*
Stem glandular-puberulent; uppermost leaves and involucral bracts distinct . . . . . 13. *A. oblongifolius*
Leaves thin, lanceolate, acuminate, subentire to serrate . 15. *A. modestus.*
Q. Involucre not glandular *S.*
S. Basal leaves with definite margined petioles.
Involucral bracts oblong, coriaceous.
Leaves entire or slightly dentate.
Bracts strongly ciliate; involucre turbinate-hemispherical . . . . . 9. *A. surculosus.*
Bracts not ciliate, nearly or quite glabrous; involucre slender-turbinate . . . . . 10. *A. gracilis.*
Leaves serrate . . . . . 11. *A. radula.*
Involucral bracts linear or linear-subulate, thin . . . 47. *A. tardiflorus.*
S. None of the leaves definitely petioled, or the lower inconspicuously so *T.*
T. Stem-leaves linear *U.*
U. Stem glabrous or glabrate, or only slightly pubescent above *V.*
V. Involucre 5 mm. or less high *W.*
W. Bracts with definite firm subulate tips.
Involucre hemispherical or campanulate, as broad as high . . . . . 33. *A. ericoides.*
Involucre turbinate, only 2–3 mm. broad . . 34. *A. depauperatus*
W. Bracts without firm subulate tips *X.*
X. Bracts with conspicuous elliptic or subrhombic green tips.
Heads terminating minutely foliose branchlets . 38. *A. dumosus.*
Heads paniculate or if few on leafy (not minutely foliose-bracteolate) branchlets . . . 43. *A. salicifolius*
X. Bracts attenuate, without conspicuous dilated tips.
Rays white (or lavender-tinged).
Branches ascending-paniculate; heads in racemo-paniculate clusters.

Rays 6 mm. or less long; leaves slightly serrate . . 41. *A. Tradescanti.*
Rays longer; leaves entire . . (42) *A. paniculatus*, v. *bellidiflorus.*
Branches divaricate; small heads in 1-sided racemes . 39. *A. vimineus.*
Branches ascending, terminated by solitary heads (39) *A. vimineus*, v. *saxatilis.*
Rays violet or rose-pink (exceptionally white).
Leaves at most 4.5 cm. long, becoming revolute . . 55. *A. nemoralis.*
Leaves longer, plane . . . . . 44. *A. junceus.*
V Involucre more than 5 mm. high *Y.*
Y. Bracts with definite firm subulate tips . . . . . 32. *A. polyphyllus.*
Y. Bracts without firm subulate tips *Z.*
Z. Leaves at most 4.5 cm. long.
Stems many, rigid, from a woody caudex; bracts firm, the inner blunt; rays blue-violet . . . . . 52. *A. linariifolius.*
Stem single, from a slender rootstock; bracts thin, linear-attenuate; rays rose-pink . . . . . 55. *A. nemoralis.*
Z. Leaves longer *a.*
a. Annuals, with inconspicuous rays.
Bracts definitely imbricated, linear or linear-subulate . 57. *A. subulatus.*
Bracts subequal, the outer foliaceous.
Leaves linear-attenuate; rays shorter than the style . 58. *A. angustus.*
Leaves linear-oblanceolate to spatulate; rays longer than the style . . . . . 59. *A. frondosus.*
a. Perennials, with mostly conspicuous rays *b.*
b. Bracts firm, lanceolate.
Bracts unequal, regularly imbricated, not foliaceous . 56. *A. tenuifolius.*
Bracts subequal or imbricated, with spreading foliaceous tips . . . . . 1. *A. paludosus.*
b. Bracts thin, linear or linear-lanceolate.
Bracts with conspicuous elliptic or subrhombic green tips.
Heads terminating minutely foliose-bracteolate branchlets . . . . . 38. *A. dumosus.*
Heads paniculate, or if few on leafy (not minutely foliose-bracteolate) branches . . . . . 43. *A. salicifolius.*
Bracts without conspicuous colored tips.
Rays white; bracts very narrowly linear-attenuate, regularly imbricated, 4–6 mm. long (42) *A. paniculatus*, v. *bellidiflorus*
Rays violet or rose-pink; bracts linear-lanceolate, less definitely imbricated, mostly longer . . . 44. *A. junceus.*
U. Stem conspicuously pubescent.
Involucral bracts (or at least the outer ones) bristly-ciliate.
Leaves crowded, rigid; rays white (rarely purple-tinged).
Heads 5–6 mm. high . . . . . 36. *A. multiflorus.*
Heads 7–9 mm. high . . . . . 37. *A. commutatus.*
Leaves not rigid; rays blue . . . . . 35. *A. amethystinus.*
Involucral bracts not bristly-ciliate.
Bracts with firm subulate tips; short rays usually white.
Involucre hemispherical or campanulate, as broad as high (33) *A. ericoides*, v. *villosus.*
Involucre turbinate, narrower than high . . (34) *A. depauperatus*, v. *parviceps.*
Bracts thin, linear-attenuate, without firm subulate tips; stem puberulent; long rays violet or rose-pink . . . . . 55. *A. nemoralis.*
T Stem-leaves lanceolate or broader *c.*
c. Heads in flat-topped corymbs; rays white or whitish (not blue or violet).
Leaves rigid, linear-lanceolate; pappus simple. . . . . 53. *A. ptarmicoides*
Leaves not rigid, broader; pappus double.
Involucre 3–4.5 mm. high; leaves lanceolate to ovate . . . 50. *A. umbellatus.*
Involucre 5–7 mm. high; leaves obovate to oblong . . . 51. *A. infirmus.*
c. Heads paniculate or racemose *d.*
d. Stems glabrous or essentially so *e.*
e. Involucre 5 mm. or less high.
Bracts with definite firm subulate tips . . . . . 33. *A. ericoides.*
Bracts without firm subulate tips.
Heads in more or less 1-sided racemes.
Leaves narrowly lanceolate, scarcely serrate; bracts linear-attenuate. . . . . 39. *A. vimineus.*
Leaves broader, serrate; bracts with the midrib dilated upward and rather conspicuous . . . . . 40. *A. lateriflorus.*
Heads on ascending-paniculate branches.
Bracts linear-attenuate.
Heads (including rays) 1–1.5 cm. broad; bracts very slender and green . . . . . 41. *A. Tradescanti.*
Heads larger; bracts green chiefly at tip . . . . . 42. *A. paniculatus.*
Bracts broad-linear or linear-oblong, with conspicuous elliptic or subrhombic green tips . . . . . 43. *A. salicifolius.*
e. Involucre more than 5 mm. high *f.*
f. Bracts with definite firm subulate tips . . . . . 32. *A. polyphyllus.*
f. Bracts without firm subulate tips *g.*
g. Leaves on branchlets reduced to rigid subulate bracts.
Perennial; involucre 9 mm. or more high, of firm closely imbricated bluntish bracts . . . . . 28. *A. turbinellus.*

Annual; involucre 6–8 mm. high, of linear-subulate loosely imbricated bracts . . . . . 57. *A. subulatus.*
g. Leaves on branchlets broader *h.*
h. Inflorescence loosely paniculate-corymbose.
Bracts thin, uniform, linear-lanceolate; rays few, white or pinkish, rarely wanting . . . . . 54. *A. acuminatus.*
Bracts firm, oblong, the tips foliaceous; rays numerous, violet . . . . . 11. *A. radula.*
h. Inflorescence definitely paniculate *i.*
i. Bracts ascending, their tips not squarrose.
Bracts regularly imbricated in several series.
Bracts linear-attenuate . . . . . 42. *A. paniculatus.*
Bracts broad-linear or linear-oblong, with conspicuous elliptic or subrhombic green tips . . . . . 43. *A. salicifolius.*
Bracts subequal . . . . . 45. *A. longifolius.*
i. Bracts with spreading or squarrose tips, the outer mostly foliaceous . . . . . 46. *A. novi-belgii.*
a. Stem conspicuously pubescent *j.*
j. Bracts with definite firm subulate tips.
Involucre hemispherical or campanulate, as broad as high; leaves lanceolate to oblong-lanceolate . . . . (33) *A. ericoides*, v. *platyphyllus.*
Involucre turbinate, narrower than high . . (34) *A. depauperatus*, v. *parviceps.*
j. Bracts without firm subulate tips.
Heads solitary or loosely paniculate-corymbose; bracts thin, linear-lanceolate, loosely imbricated; rays whitish, violet, or rose-pink.
Leaves essentially uniform and crowded on the stem, entire or slightly toothed, blunt or acutish . . . . . 55. *A. nemoralis.*
Upper leaves largest, coarsely toothed, long-acuminate . . 54. *A. acuminatus.*
Heads paniculate or racemose; bracts rather closely imbricated.
Bracts regularly imbricated in several series; rays short, white to lavender.
Heads regularly paniculate; bracts linear-attenuate; leaves lanceolate . . . . . (42) *A. paniculatus*, vars.
Heads in more or less 1-sided racemes; bracts generally with colored dilated midribs; leaves lanceolate to oblong . . 40. *A. laterifiorus.*
Bracts subequal; rays long, blue or violet; stem densely villous (45) *A. longifolius*, v. *villicaulis.*

§ 1. HELEÁSTRUM (DC.) B. & H. *Pappus simple, coarse and rigid, the stronger bristles somewhat clavate; bracts rigid, more or less foliaceous, nearly equal.*

1. **A. paludòsus** Ait. Stems 3–7 dm. high, glabrous or nearly so; heads rather few, racemose or spicate; involucre 1 cm. high; outer bracts lax, foliaceous; rays purple; leaves linear, entire. — Kan. to Tex., N. C., and Ga. Fig. 918.

918. A. paludosus.

§ 2. BIÒTIA (DC.) T. & G. *Involucre obovoid-bell-shaped, turbinate, or cylindric; the bracts regularly imbricated in several rows, appressed, nearly destitute of herbaceous tips; rays 6–18; achenes slender; pappus slightly rigid, simple; lower leaves heart-shaped, petioled, coarsely serrate; heads in open corymbs (rarely congested).*

* *Rays white (sometimes colored in age); branches of inflorescence without glands.*

← *Involucre ovoid-bell-shaped or turbinate; plants simple, rarely producing large tufted basal leaves.*

↔ *Leaves thin, smooth or sparsely hairy but not rough.*

2. **A. divaricàtus** L. *Stem slender*, somewhat zigzag, 3–9 dm. high, glabrous or sparingly pilose; *leaves coarsely and unequally serrate with sharp spreading teeth, taper-pointed*, ovate, ovate-lanceolate, or deltoid-ovate, all but the uppermost heart-shaped at the base and on slender naked petioles; involucre 6–8 mm. high; bracts thin, scarious, mostly obtuse and ciliate, with inconspicuous green tips, the outer short and oblong or oblong-triangular, the inner linear; rays 6–12.

919. A. divaricatus.

(*A. corymbosus* Ait.) — Woodlands, s. Me. and w. Que. to L. Superior, s. to Ga. Aug.–Oct. FIG. 919. — Extremely variable in outline of foliage, intensity of coloring of disk-flowers, etc., characters upon which Professor E. S. Burgess proposes as separable species *A. carmesinus*, *A. tenebrosus*, and 26 others.

920. A. furcatus.

+ + Leaves thick, rough above.

= Heads few, large (1–1.5 cm. high).

3. **A. furcàtus** Burgess. Stem slender, 3–6 dm. high, almost uniformly leafy to the *slightly forked summit;* leaves ovate or elliptic, acuminate, coarsely serrate, lower short-petioled and slightly cordate, upper mostly sessile, often with broad-winged laciniate bases; involucre of 4–5 series of pubescent pale green regularly imbricated blunt bracts, the outer oblong, the inner linear, all with dark tips; rays 1 cm. or more long, narrow. — Woods and rocky shaded banks, Ill. and Mo. Aug.–Oct. FIG. 920.

= = Heads smaller (hardly 1 cm. high), numerous in corymbose or subumbellate clusters at the tips of the branches.

4. **A. glomeràtus** Bernh. Rather stout, 4.5–9 dm. high; stem smooth, or pilose toward the summit; leaves pilose beneath or glabrate; the lower broadly ovate, acuminate, long-petioled; the upper gradually smaller and narrower, on winged petioles or sessile; *involucre* green, *broadly campanulate; bracts* ciliate, dark-tipped, *the inner ones slightly elongated*, scarious only on the margins; *rays short, rarely* 0.5 *cm. long.* — Thickets and wooded banks, Me. to Va. Aug., Sept. FIG. 921.

921. A. glomeratus.

+ + Involucre slender, cylindric; bracts thin and scarious (loose and spreading when dry), the innermost much exceeding the next outer series; large tufted basal leaves abundant.

5. **A. Schrebèri** Nees. Resembling the preceding; stem smooth or pilose; *leaves thin*, often pilose on the petioles and veins beneath, smooth or harsh above; *basal* ones *large*, when well developed with broad rectangular sinuses; involucre slightly imbricated; *rays* 1 *cm. long.* (Including *A. curvescens* Burgess.) — Damp woods and thickets, N. E. to Va. July–Sept. FIG. 922.

922. A. Schreberi.

** * Rays violet or blue (rarely white); branches of the inflorescence glandular.*

6. **A. macrophýllus** L. Rather *coarse*, 0.3–1.5 m. high, *viscid-glandular* at least in the *inflorescence*; *sterile tufts* of large ovate cordate leaves *abundant;* basal leaves large, cordate; the upper of various forms, usually smaller and narrower; *involucre* generally 3–4-seriate; *bracts greenish*, the *outer* short-ovate, *blunt*, and *pubescent;* the *inner elongated*, linear, *more scarious*, sometimes roseate-tinged on the margins. — An extremely variable plant, from which several forms are separated, by some authors, as species. — The typical plant is simple, 3–9 dm. high, characterized by *thick harsh foliage*, *stout* rather *smooth stem*, and broad terminal corymbose inflorescence with *many conspicuous stipitate glands.* (Including *A. roscidus*, etc., Burgess.) — Open woods and thickets, N. B. to Minn. and N. C. Aug., Sept. FIG. 923. The following varieties include the best-marked extremes. Var. PINGUIFÒLIUS Burgess. Stem glabrous, 5–6 dm. high; *many* of the *basal leaves very smooth (almost greasy)*, others scabrous at least in spots. — Me. to N. Y. and westw. Var. EXCÉLSIOR Burgess. Stem smoothish, 1 m. or so high, *glaucous; leaves pale*, for the most part *narrowly ovate, oblong, or lanceolate;* bracts elongated. — N. H. to Ont. and Mich. Var. VELÙTINUS Burgess. *Stems villous-pubescent; leaves* pilose

923. A. macrophyllus.

beneath, all but the lowest *truncate or tapering at base.* — Throughout the range, the commonest form northw. Var. SEJÚNCTUS Burgess. Similar to the preceding variety, but most of the *stem-leaves long-petioled, broad and cordate.* — Me. to Pa. and Wisc. Var. APRICÉNSIS Burgess. *Freely branching from near the base*, bearing innumerable heads. — Me. to Pa. Var. IÁNTHINUS (Burgess) Fernald. *Glands minute*, rarely stipitate; *leaves thin.* (Including *A. ianthinus, violaris, multiformis*, and *nobilis* Burgess.) — Me. to Ont. and W. Va.

§ 3. EUÁSTER Gray. *Bracts imbricated in various degrees, with herbaceous or leaf-like summits, or the outer entirely foliaceous; rays numerous; pappus simple, soft and nearly uniform (coarser and more rigid in the first group); achenes flattened.*

* *Bracts well imbricated, coriaceous, with short herbaceous mostly obtuse spreading tips; pappus of rigid bristles; stem-leaves all sessile, none heart-shaped or clasping; heads few or when several corymbose, large and showy.*

← *Lowest leaves ovate or ovate-oblong, on nearly naked petioles, some rounded or subcordate at base.*

924. A. Herveyi.

7. **A. Hervèyi** Gray. Slightly scabrous, 3–9 dm. high, the summit and peduncles glandular-puberulent; leaves roughish, obscurely serrate, the upper lanceolate; heads loosely corymbose, 1 cm. or so high; involucre nearly hemispherical; bracts obscurely glandular, all erect, with very short or indistinct green tips; rays violet, 1–1.5 cm. long. — Borders of oak woods, in rather moist soil, e. Mass. to Ct. and L. I. FIG. 924. — An ambiguous species, approaching the preceding and the next.

← ← *Radical leaves (usually absent in no. 11) all tapering into margined petioles; involucres squarrose (hardly so in no. 11); rootstocks slender.*

925. A. spectabilis.

8. **A. spectábilis** Ait. Stems 3–6 dm. high, roughish and glandular-puberulent above; leaves oblong-lanceolate or the lower spatulate-oblong, obscurely serrate or the upper entire; heads few, hemispherical; involucre 1–1.5 cm. high; *bracts glandular-puberulent and viscid*, mostly with the *upper half herbaceous and spreading;* rays about 20, bright violet, 2 cm. long. — Sandy soil, Mass. to Del., near the coast; also w. N. C. Aug.–Oct. FIG. 925.

926. A. surculosus.

9. **A. surculòsus** Michx. Stems 2.5–4 dm. high, *from long filiform rootstocks; leaves entire* or nearly so, *rigid*, lanceolate or the upper linear; *heads* few or solitary, as in the preceding, but generally *smaller*, the *bracts hardly glandular.* — Moist ground, coast of N. J., and southw. Aug.–Oct. FIG. 926.

927. A. gracilis.

10. **A. grácilis** Nutt. Rootstocks occasionally tuberous-thickened; stems slender, 3–4 dm. high; leaves oblong-lanceolate, entire or nearly so, small (2–5 cm. long); heads few or several; involucre top-shaped, 6–9 mm. long, glabrous, not glandular nor viscid, the *coriaceous whitish bracts with very short deltoid or ovate tips;* rays 9–12, 0.5–1 cm. long. — Pine barrens, N. J. to N. C., Ky., and Tenn. July–Sept. FIG. 927.

11. **A. rádula** Ait. Stem simple or corymbose at the summit, smooth or sparsely hairy, many-leaved, 3–12 dm. high; *leaves oblong-lanceolate, pointed, sharply serrate in the middle, very rough both sides and rugose-*

veined, closely sessile, 5–8 cm. long, nearly uniform; heads 1–40; *bracts of bell-shaped involucre oblong, obtuse, appressed*, clearly in several series, *with very short and slightly spreading herbaceous ciliate tips;* rays pale violet; achenes smooth. — Bogs and low woods, Nfd. to Del. and w. Va. July–Sept. Fig. 928.

928. A. radula.

Var. stríctus (Pursh) Gray. Slender, 1–8 dm. high; heads 1–8; involucral bracts more foliaceous, acute or acutish, nearly equal. (Var. *biflorus* Porter.) — Damp rocky or mossy places, n. Lab. and Hudson B. to Nfd., N. B., and n. N. E.

** *Involucre and usually the branchlets viscid- or pruinose-glandular, well imbricated or loose; pubescence not silky; leaves entire (or the lower with few teeth), the cauline all sessile or clasping; rays showy, violet to purple; involucral bracts spreading, in few or many ranks.*

12. A. grandiflòrus L. *Minutely hispid;* stems slender, loosely much branched, 3–9 dm. high; *leaves very small* (0.5–4 cm. long), oblong-linear, obtuse, rigid, the uppermost passing into bracts of the hemispherical squarrose many-ranked involucre; rays bright violet, 2.5 cm. long; achenes hairy. — Dry open places, Va., and southw. — Heads large and very showy. Fig. 929.

929. A. grandiflorus.

13. A. oblongifòlius Nutt. *Minutely glandular-puberulent*, much branched above, rigid, paniculate-corymbose, 3–7 dm. high; *leaves narrowly oblong or lanceolate*, mucronate-pointed, partly clasping, thickish, 2.5–5 cm. long, 0.5–1 cm. wide; involucral bracts nearly equal, broadly linear, appressed at the base; rays violet-purple; achenes canescent. — Bluffs and rocky banks, Pa. and Va. to Minn. and Kan. Sept., Oct. — Heads middle-sized or smaller. Fig. 930.

930. A. oblongifolius.

Var. rigídulus Gray. Low, rarely more than 3 dm. high, with more rigid and hispidulous-scabrous leaves. (*A. Kumleini* Fries.) — More exposed situations, Ill., Wisc., and southwestw. Late July–Oct.

14. A. nòvae-ángliae L. *Stem stout, hairy*, 0.5–2.5 m. high, corymbed at the summit; *leaves numerous, lanceolate, entire, acute, auriculate-clasping, clothed with minute pubescence*, 0.5–1 dm. long; *bracts nearly equal, linear-awl-shaped, loose, glandular-viscid*, as well as the branchlets; rays violet-purple, rarely white, very numerous; achenes hairy. — Moist chiefly calcareous grounds, centr. Me. to w. Que., westw. and southw. Aug.–Oct. — Heads large; a very handsome species, popular in cultivation. (Escaped from gardens, and locally naturalized in Eu.) Fig. 931. Var. ròseus (Desf.) DC. Rays pink or rose-color. — Range of the typical form, local.

931. A. novae-angliae.

15. A. modéstus Lindl. Pubescent or glabrate; *stem slender, simple, with few large heads terminating slender branchlets; leaves* lanceolate, very acute, *narrowed to a sessile base*, sparingly serrate or serrulate; bracts linear-attenuate, equal, mostly herbaceous; rays dark violet. (*A. major* Porter.) — Rich soil, w. Ont. and n. Minn. to B. C. and Ore. July–Sept. Fig. 932.

932. A. modestus.

* * * *Leaves whitened, silvery-silky both sides, all sessile and entire, mucronulate; involucre imbricated in 3–several rows; rays showy, purple-violet.*

933. A. sericeus.

16. **A. seríceus** Vent. Stems slender, 2–6 dm. high, branched; leaves silver-white, lanceolate or oblong; *heads mostly solitary*, terminating the short branchlets; *bracts of the globular involucre similar to the leaves, spreading*, except the short coriaceous base; *achenes smooth*, many-ribbed. — Prairies and dry banks, Wisc. to Man., Tex., and Tenn. Aug.–Oct. — Heads large; rays 20–30. Fig. 933.

934. A. concolor.

17. **A. cóncolor** L. Stems wand-like, nearly simple, 3–9 dm. high; *leaves crowded*, oblong or lanceolate, *appressed*, the upper reduced to little bracts; *heads in a simple or compound wand-like raceme;* bracts of the obovoid involucre closely imbricated in several rows, appressed, rather rigid, silky, lanceolate; *achenes silky.* — Dry sandy soil near the coast, Mass., and southw. Late Aug.–Nov. Fig. 934.

* * * * *Leaves entire, the lower not heart-shaped, the cauline all with sessile and cordate-clasping base, the auricles generally meeting around the stem.*

935. A. patens.

18. **A. pàtens** Ait. Rough-puhescent; stem loosely panicled above, 3–9 dm. high, with widely spreading branches; heads mostly solitary, terminating slender branchlets, 1–2 cm. broad, with showy deep blue-purple rays; leaves oblong-lanceolate or ovate-oblong, often contracted below the middle, rough, especially above and on the margins, the cauline 2.5–7 cm. long; bracts of the minutely roughish involucre with spreading pointed tips; achenes silky. — Dry ground, centr. Me. to Minn., and southw. Aug.–Oct. Fig. 935. Var. PHLOGIFÒLIUS Nees. A form usually of shady places, with the larger (6–15 cm. long) and elongated thin scarcely rough leaves downy underneath, sometimes toothed toward the end, mostly much contracted below the middle. (*A. phlogifolius* Muhl.) — Mass. to O. and Tenn.

Var. **grácilis** Hook. Stem-leaves very short (1–2 cm. long), thickened and harsh, those of the flowering branches mostly minute. — Ky. to Kan., and southwestw.

* * * * * *Lower leaves heart-shaped and petioled; no glandular or viscid pubescence; heads with short and appressed green-tipped bracts (except in nos.* 19 *and* 26), *mostly small and numerous, racemose or panicled.*

← *Heads middle-sized, with many rays, and squarrose foliaceous involucre.*

19. **A. anómalus** Engelm. Somewhat puhescent and scabrous; stems slender, 1 m. high, simple or racemose-branched above; leaves ovate or ovate-lanceolate, pointed, entire; the upper small, almost sessile; bracts of the hemispherical involucre imbricated in several rows, appressed, with linear spreading leafy tips; achenes smooth. — Limestone cliffs and rocky woods, Ill., Mo., and Ark. Sept., Oct. — Rays violet-purple. Fig. 936.

936. A. anomalus.

← ← *Rays* 10–20; *involucral bracts appressed or erect.*

↔ *Leaves entire or slightly serrate; heads middle-sized; rays bright blue.*

20. **A. azùreus** Lindl. Stem rather rough, erect, racemose-compound at the summit, the branches slender and rigid;

leaves rough, the lower ovate-lanceolate or oblong, heart-shaped, on long often hairy petioles; the others lanceolate or linear, sessile, on the branches awl-shaped; involucre inversely conical. — Copses and prairies, w. N. Y. and Ont. to Minn., Mo., and southw. Sept., Oct. — Involucre much as in *A. laevis*, but smaller and slightly pubescent. Fig. 937.

937. A. azureus.

21. **A. Shórtii** Lindl. Stem slender, spreading, nearly smooth, bearing very numerous heads in racemose panicles; *leaves smooth above, minutely pubescent underneath, lanceolate or ovate-lanceolate, elongated,* tapering gradually to a sharp point, *all but the uppermost more or less heart-shaped at base and on naked petioles,* none clasping; involucre bell-shaped. — Cliffs and banks, w. Pa. to Ill., and southw. Aug.–Oct. — A pretty species, 1 m. high; leaves 0.5–1.5 dm. long. Fig. 938.

938. A. Shortii.

22. **A. undulàtus** L. Pale or somewhat hoary with close pubescence; stem spreading, bearing numerous heads in racemose panicles; *leaves ovate or ovate-lanceolate, with wavy or slightly toothed margins, roughish above, downy underneath;* the lowest heart-shaped, on margined petioles; the others *abruptly contracted into short broadly winged petioles which are dilated and clasping at the base,* or directly sessile by a heart-shaped base; involucre obovoid, the bracts less rigid. — Dry copses, N. B. to Ont., Minn., and southw. Aug.–Nov. Fig. 939. — Very variable in outline of leaves, etc., upon which characters Professor E. S. Burgess proposes many species.

939. A. undulatus.

Leaves for the most part conspicuously serrate; rays pale blue or nearly white.

23. **A. cordifòlius** L. Stem nearly glabrous, much branched above, *the spreading or diverging branches bearing very numerous panicled heads; leaves thin,* sharply serrate, *minutely scabrous above; the lower* all heart-shaped, on generally *slender and naked ciliate petioles;* the upper chiefly cordate; *bracts of the inversely conical involucre all appressed and tipped with very short green points, obtuse or acutish.* — Woods and thickets, e. Que. to Ia., s. to Ga. and Mo. Aug.–Oct. — Heads profuse, but rather small. Fig. 940. Var. Furbíshiae Fernald. Stems, petioles, and lower surfaces of leaves densely villous. — Banks of streams, N. B., Me., and N. H. Var. polycéphalus Porter. Most of the upper leaves truncate or narrowed at base. — Range of the typical form.

940. A. cordifolius.

941. A. sagittifolius.

24. **A. Lowrieànus** Porter. Resembling *A. cordifolius; leaves thickish, glaucous* beneath, *smooth,* often greasy to the touch, sharply or obscurely serrate; *the lower* ovate, cordate, *on mostly winged petioles.* — Open woods and thickets, Ct. to Ont. and N. C. Sept., Oct. Var. lanceolàtus Porter. Most of the lower leaves lanceolate or lance-ovate, truncate or narrowed at base. (Var. *lancifolius* Porter.) — Similar range. Var. incìsus Porter. Leaves all lanceolate, the lower incised. (Var. *Bicknellii* Porter.) — N. Y. and Pa., local.

25. **A. sagittifòlius** Wedemeyer. Stem rigid, erect, smooth or slightly

hairy, with *ascending branches bearing numerous racemose heads;* leaves ovate-lanceolate, pointed; the lower heart-shaped at base, on margined petioles; the upper lanceolate or linear, pointed at both ends; *bracts of the oblong involucre linear, tapering into awl-shaped slender and loose tips.* — Dry ground, Vt. to Ky., and westw. Aug.–Oct. — Heads rather larger than in no. 23. Fig. 941.

942. A. Drummondii.

26. **A. Drummóndii** Lindl. *Pale with fine gray pubescence;* leaves cordate to cordate-lanceolate, mostly on margined petioles, the uppermost lanceolate and sessile; *bracts acute or acutish.* — Open ground, etc., Ill. to Minn. and Tex. Aug.–Oct. Fig. 942. — Passing into the preceding.

943. A. Lindleyanus.

27. **A. Lindleyànus** T. & G. Rather stout, 3–10 dm. high, nearly glabrous; *radical and lowest leaves ovate, moderately or obscurely cordate,* the uppermost sessile and pointed at both ends; *heads larger,* in a loose thyrse or panicle, *the linear-attenuate bracts looser and less imbricated;* rays blue-violet. — Thickets and open places, Lab. to Mackenzie, s. to N. B., n. N. E., Mich., S. Dak., and Mont. Aug.–Oct. Fig. 943. Var. exímius Burgess. Tall (often 2 m. high); leaves harsh above. — N. Y. and O. Var. comàtus Fernald. Stems, petioles, and lower surfaces of the leaves villous. — Range of the typical form, local.

* * * * * * *Without heart-shaped petioled leaves, the radical and lower all acute or attenuate at base; not glandular nor viscid, nor silky-canescent.*

← *Smooth and glabrous throughout (or nearly so, except forms of no. 33), and usually pale and glaucous; involucral bracts closely imbricated, firm and whitish-coriaceous below, green-tipped; leaves firm, usually entire.*

↔ *Rays violet or blue; bracts rather abruptly green-tipped; leaves on the branchlets reduced to rigid subulate bracts.*

944. A. turbinellus.

28. **A. turbinéllus** Lindl. Stem slender, 0.5–1 m. high, paniculately branched; leaves oblong to narrowly lanceolate, tapering to each end, with rough margins; *involucre elongated-obconical* or almost club-shaped, 9 mm. or more in length; the bracts linear, with very short and blunt green tips; rays violet-blue; achenes nearly smooth. — Dry hills, etc., Ill. to Neb., and southwestw. Sept., Oct. — Well marked and handsome. Fig. 944.

945. A. laevis.

29. **A. laèvis** L. Stouter, 0.5–1 m. high; heads in a close panicle; leaves thickish, lanceolate or ovate-lanceolate, chiefly entire, the upper more or less clasping by an auricled or heart-shaped base; bracts of the *short-obovoid or hemispherical involucre* with short abrupt green tips; rays blue-violet (rarely white); achenes smooth. — Dry soil, Me. to Ont., westw. and southw. Aug.–Oct. — A variable and elegant species. Fig. 945. A form with broad ovate leaves is var. amplifòlius Porter.

946. A. virgatus.

30. **A. virgàtus** Ell. Slender, strict and simple, with few or several *racemose or terminal heads,* like those of

the last; *leaves lanceolate or linear, the lower usually long and narrow.* (*A. purpuratus* Necs.) — Va., W. Va., and southw. Sept., Oct. Fig 946.

947. A. concinnus.

31. **A. concinnus** Willd. *Not glaucous*, slender, 3–9 dm. high; leaves lanceolate, mostly somewhat serrate, the lowest spatulate-lanceolate on winged petioles; *heads smaller* than in no. 29, *numerous, panicled;* bracts of involucre loose, with more herbaceous narrower green tips; rays violet. — Rocky woods, rare, Ct., and southw. Aug., Sept. — An ambiguous species. Fig. 947.

++ ++ *Rays white, rarely purplish; bracts narrow, subulately green-tipped; leaves mostly narrow, narrowed at base, on the branchlets lax and attenuate.*

32. **A. polyphýllus** Willd. Low or tall, 1–15 dm. high, with virgate branches; cauline leaves lanceolate or linear, 0.5–1 dm. long; heads paniculate; bracts lanceolate-subulate, the outermost much shorter; rays 1 cm. long. (*A. Faxoni* Porter). — Rocky or gravelly soil, e. Me. and n. Vt. to Ont., Wisc., and southw. Aug.–Oct. Fig. 948. — Heads larger than in the next.

948. A. polyphyllus.

33. **A. ericoides** L. Smooth, 3–9 dm. high; the simple branchlets or peduncles racemose along the upper side of the wand-like spreading branches; lowest leaves oblong-spatulate, sometimes toothed; the others linear-lanceolate or linear-awl-shaped; *heads 6 mm. high or less; involucre hemispheric or campanulate; bracts* often nearly equal, *with attenuate or awl-shaped green tips.* — Dry open places, N. E. to Ont., Minn., and southw. Aug.–Oct. Fig. 949. Var. villòsus T. & G. Similar, but the stem and generally the narrow leaves villous-hirsute. (Var. *pilosus* Porter.) — Same range. Var. Prínglei Gray. A low slender northern form, with few erect branches and rather small scattered mostly solitary heads. (*A. Pringlei* Britton.) — Me. to Ont., s. to Mass. and Wisc.

949. A. ericoides.

Var. **platyphýllus** T. & G. Stout; stem and branches densely white-villous; leaves lanceolate or oblong-lanceolate, mostly pubescent; heads as in the typical form, but larger. — O. to Mich., Ill., and southw.

34. **A. depauperàtus** (Porter) Fernald. *Slender*, glabrous, 1–4 dm. high; basal leaves small, spatulate; stem-leaves linear, those of the branches linear-subulate; *heads small, 4–5 mm. high,* terminating the slender divaricate branches; *involucre turbinate, 2–3 mm. broad,* of about 20 linear-subulate bracts, these less rigid than those of the preceding species. (*A. ericoides*, var. *pusillus* Gray, and var. *depauperatus* Porter.) — Serpentine barrens, s. Pa. and adjacent W. Va. July–Sept. Fig. 950.

950. A. depauperatus.

Var. **párviceps** (Burgess) Fernald. Stout, pilose, 3–7 dm. high; leaves linear or lanceolate; heads rather crowded. (*A. ericoides*, var. Burgess.) — Prairies and woods, Ill. and Mo.

951. A. amethystinus.

+ + *Hoary-pubescent or hirsute; herbaceous tips of the more or less bristly-ciliate involucral bracts squarrose or spreading; cauline leaves small, linear, entire, scarcely narrowed at the sessile or partly clasping base; heads numerous, small, racemose.*

35. **A. amethýstinus** Nutt. Tall (0.5–1.5 m. high), upright, much branched, puberulent or somewhat hirsute; *leaves not rigid;* heads 6 mm. high; the tips of the bracts

merely spreading; *rays light clear blue* or rarely violet. — Moist grounds, e. Mass. and s. Vt. to Pa., Mo., and Ia., rare. Sept. Fig. 951. — Perhaps a hybrid of nos. 14 and 36.

36. **A. multiflòrus** Ait. Pale or hoary with minute close pubescence, 3–9 dm. high, much branched and bushy; the heads much crowded on the spreading racemose branches; *leaves rigid*, crowded, spreading, with rough or ciliate margins, the uppermost passing into the spatulate obtuse hispidulous-ciliate bracts; heads 5–6 mm. long; *rays white* or rarely purplish, 10–20. — Dry sandy soil, s. Me. to Ont., westw. and southw. Aug.–Oct. Fig. 952. Var. exíguus Fernald. Heads solitary or slightly clustered at the tips of slender flexuous branches. — Less common.

952. A. multiflorus.

37. **A. commutàtus** (T. & G.) Gray. Similar; *heads larger* (7–9 mm. long); rays 20–30 (*A. incanopilosus* Sheldon.) — Plains, Minn. to Sask., westw. and southwestw. July–Oct.

← ← ← *Bracts glabrous, closely imbricated (the outer regularly shorter), not coriaceous, with short appressed green tips; branches slender, divaricate or divergent; leaves lanceolate to subulate; heads small (4–7 mm. high) and numerous.*

↔ *Heads scattered, terminating minutely foliose slender branchlets.*

38. **A. dumòsus** L. Smooth or nearly so, 3–9 dm. high, the branches slender, loosely paniculate, divergent; leaves linear or the upper oblong, crowded, entire, with rough margins; heads rather numerous; involucre obconical or campanulate, with 4–6 rows of linear-spatulate obtuse bracts with abrupt green tips; rays pale purple or blue, larger than in no. 39. — Sandy soil, s. Me. to Ont., and southw., except in the upland regions. Aug., Sept. Fig. 953.

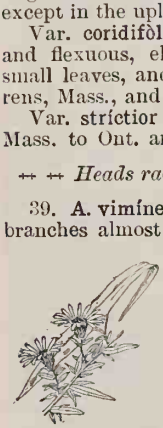
Var. **coridifòlius** (Michx.) T. & G. Branchlets slender and flexuous, elongated, with minute crowded divergent small leaves, and generally solitary terminal heads. — Barrens, Mass., and southw.

Var. **stríctior** T. & G. Branches stiff and ascending. — Mass. to Ont. and N. C.

953. A. dumosus.

↔ ↔ *Heads racemosely unilateral upon very short minutely leafy branchlets.*

39. **A. vimíneus** Lam. *Smooth or smoothish*, 0.5–2 m. high, bushy, the long branches almost horizontally spreading; leaves linear or narrowly lanceolate, elongated, the larger ones remotely serrate in the middle with fine sharp teeth; heads small, 4–6 mm. high, crowded; *bracts narrowly linear, acute or acutish*, in 3–4 rows; rays white. — Moist soil, s. Me. to Ont., westw. and southw. Aug.–Oct. Fig. 954. Var. folioldsus (Ait.) Gray. Leaves linear, entire; the ascending branches with more scattered paniculate heads. — Similar range.


954. A. vimineus.

Var. **saxátilis** Fernald. Low (1.5–6 dm. high); branches and branchlets short, ascending, leafy-bracteate, terminated by solitary larger heads (often 1.5 cm. broad). — Rocky shores, N. E. and Que. to O.

40. **A. lateriflòrus** (L.) Britton. *More or less pubescent*, much branched; *leaves* lanceolate or oblong-lanceolate, tapering or pointed at each end, *sharply serrate in the middle; bracts of the involucre linear, acute or rather obtuse*, imbricated in 3–4 rows. (*A. diffusus* Ait.) — Thickets, fields, etc., very common from N. S. to Ont., and southw. Aug.–Oct. — Extensively variable; leaves larger than in either of the two preceding; the involucre intermediate between them, as to the form of the bracts. Rays mostly short, white or pale bluish-purple. Fig. 955.

955. A. lateriflorus.

Var. GLOMERÉLLUS (T. & G.) Burgess. Simple or subsimple; leaves oblong-lanceolate, hispidulous; inflorescences small and axillary, or short, terminal, and spicate. — N. Y. to O. and S. C.

Var. **hirsuticaûlis** (Lindl.) Porter. Slender; the stem and the midveins of the elongated lanceolate leaves generally villous or hirsute; branches slender, spreading or ascending, simple. (*A. hirsuticaulis* Lindl.) — Mostly in low woods and thickets, N. B. to Mich. and Ky.

Var. **bifrons** (Gray) Fernald. A luxuriant form, with large thin leaves (1–1.5 dm. long, 2.5–4 cm. wide), and rather larger heads loosely disposed on the spreading branches. (*A. diffusus*, var. Gray; *A. lateriflorus*, var. *grandis* Porter.) — N. Y. to S. C., Mo., and Minn.

Var. **thyrsoídeus** (Gray) Sheldon. Cinereous-pubescent or glabrate, with ovate-oblong to lanceolate leaves, the branches ascending and often short, and the thyrsoid or spicate-glomerate heads less secund. (*A. missouriensis* Britton.) — N. E. to Ont., Mo., and Tenn.

← ← ← ← *Involucre various; the heads when numerous densely or loosely paniculate on erect or ascending branches.*

↔ *Cauline leaves sessile, but the base not conspicuously cordate nor auriculate, nor contracted to a winged petiole.*

= *Heads small or middle-sized; bracts narrow, in several lengths, the erect green tips not dilated.*

41. **A. Tradescánti** L. Stem much branched, 0.5–1.5 m. high; the numerous heads (1–1.5 cm. broad) somewhat panicled or racemed; leaves lanceolate to linear, 5–15 cm. long, tapering to a long slender point; the lower somewhat serrate in the middle; *involucre 3–5 mm. long; its bracts linear, acutish*, partly green down the back; rays short and narrow, white or purplish. — Low grounds, Me. to Ont. and Minn., s. to Va. and Mo. Aug.–Oct. FIG. 956. — Some forms approach no. 39, others differ from *A. paniculatus* only in the smaller heads and shorter rays.

956. A. Tradescanti.

42. **A. paniculàtus** Lam. Stem smoothish, 0.5–2.5 m. high, much branched; the branches and scattered heads (about 2 cm. broad) loosely paniculate; leaves elongate-oblong to narrowly lanceolate, pointed, somewhat serrate or entire; the cauline 0.5–1.5 dm. long, about 1 cm. wide; *involucre 8 mm. long; its bracts narrowly linear, with attenuate green tips*, or the outermost wholly green; rays white or purplish, 6–8 mm. long. — Wet meadows, thickets, etc., throughout. Aug.–Oct. FIG. 957. — Approaches in its different forms the preceding and the three following species. Var. LANÀTUS Fernald. Stems densely white-villous or lanate. — L. Willoughby, Vt., to L. Winnipeg. Var. BELLIDIFLÒRUS (Willd.) Burgess. Leaves linear or narrow-lanceolate, mostly entire; branches ascending, with numerous clustered heads. — Throughout the range. Var. SÍMPLEX (Willd.) Burgess. Leaves large and thin, oblong-lanceolate to oblanceolate, the cauline 1–2 dm. long, 2–4 cm. wide, entire or slightly serrate; heads scattered in leafy panicles. — N. H. to Neb. and Va. Var. ACÙTIDENS Burgess. Leaves as in the preceding variety, but conspicuously and coarsely serrate; branches short, usually shorter than or little exceeding the subtending leaves. — Me. to Ill., Kan., and Ky. Var. CINERÁSCENS Fernald. Stem closely cinereous-puberulent; leaves dull green, scabrous above, lanceolate, with slightly clasping bases, subentire. — Me. to Mass. and Vt., local.

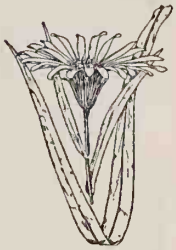
957. A. paniculatus

43. **A. salicifòlius** Ait. Similar to no. 42; the *leaves* commonly shorter, *firmer, often scabrous*, mostly entire; involucre more imbricated, the firmer linear or linear-oblong *bracts with shorter acute or obtusish green tips*; heads as

958. A. salicifolius.

large, disposed to be thyrsoid or racemose-clustered; rays rarely white. — Low grounds, Mass. to Ont., westw. and southw.; most abundant westw. Aug.–Oct. Fig. 958. Var. SUBÁSPER (Lindl.) Gray. Rigid, scabrous, with contracted leafy inflorescence, the broad heads usually leafy-bracteate, and the broader scales often obtuse. — Ill. to Neb. and Tex.

= = *Heads small or middle-sized; the looser linear bracts generally subequal and erect, and the acute green tips not dilated, the outer often wholly herbaceous.*



959. A. junceus.

44. **A. júnceus** Ait. Slender, 3–9 dm. high, simple with few heads or loosely branching; *leaves linear* or narrow, 0.5–1.5 dm. long, entire or the lower sparingly denticulate, *scabrous on the margins;* heads small (6–8 mm. high); *bracts small, narrow, in 3–4 rows, the outer somewhat shorter;* rays purple, roseate, or white, 1 cm. long. — Wet meadows and cold bogs, e. Que. to B. C., s. to n. and w. N. E., n. Pa., O., Wisc., and Neb. June–Sept. Fig. 959.

960. A. longifolius.

45. **A. longifòlius** Lam. Glabrous, 1 m. or less high, more or less branched and corymbosely panicled; leaves long-lanceolate to linear-lanceolate, 1–2 dm. long, narrowed to both ends or slightly clasping, entire or sparingly serrate; heads as in the preceding; *the bracts nearly equal and usually little imbricated, the outer looser;* rays 0.5–1.5 cm. long, violet or purplish, rarely whitish. — Low grounds, Lab. to Sask., s. to N. S., n. and w. N. E., and the Great L. region. July–Oct. Fig. 960. Var. VILLICAÚLIS Gray. Stem and midrib of the leaves densely white-villous. — Lab. to n. N. Y.

= = = *Heads middle-sized; bracts in few-several rows, more or less unequal, linear to spatulate, more herbaceous and firmer, the tips often slightly spreading or squarrose.*

46. **A. nòvi-bélgii** L. Slender, 2–10 dm. high; leaves oblong to linear-lanceolate, entire or sparingly serrate, the upper partly clasping and often somewhat auriculate; heads about 1 cm. high; rays from bright blue-violet to white. — Nfd. to Ga., mainly near the coast; also in the White Mts., and doubtfully reported westw. Late July–Oct. — The commonest late-flowered *Aster* of the Atlantic border, and very variable. The typical form has thin narrow- to oblong-lanceolate leaves, sometimes scabrous above, and linear bracts with narrow acute spreading or recurved tips. Fig. 961. Var. LAEVIGÀTUS (Lam.) Gray. Usually glabrous throughout; the thin leaves mostly oblong-lanceolate, the upper half-clasping by an abrupt base; bracts nearly equal, loosely erect, with short acutish tips. — N. E., little known. Var. LITÒREUS Gray. Rigid, mostly low, very leafy; leaves thickish, usually very smooth, oblong to lanceolate, the upper sometimes auriculate; bracts in several loose rows, all but the innermost with broadish obtuse tips, the outer usually spatulate. — Salt marshes and shores, Que. to Ga. Fig. 962. Var. ELÒDES (T. & G.) Gray. Slender, often low and simple; leaves thickish, long, narrowly linear, entire, the uppermost small and bract-like; bracts narrow, with short and mostly spreading acutish tips. — Swamps, N. J. to Va.

961. A. novi-belgii

962. A. novi-belgii, v. litoreus.

↔ ↔ *Cauline leaves (at least the lowest) conspicuously contracted into a winged petiole-like base or auriculate-clasping; involucre lax.*

47. **A. tardiflòrus** L. Glabrous or subpubescent, 0.3–1.5 m. high; *leaves* ovate- or oblong-lanceolate, sharply serrate in the middle, *narrowed at both ends, the lower to a winged petiole, not auriculate or only obscurely so;* heads loosely panicled; involucre 5–7 mm. high; bracts subequal or 2–3-seriate, linear or linear-subulate; rays light blue. (*A. patulus* Lam.) — N. B. to Pa., commonest northw. Aug.–Oct. Fig. 963. Var. vestìtus Fernald. Stems densely villous; leaves somewhat so beneath. — N. B. to Vt.

963. A. tardiflorus.

48. **A. prenanthoìdes** Muhl. Stem 1 m. or less high, corymbose-panicled, hairy above in lines; *leaves* rough above, smooth underneath, ovate to lanceolate, sharply cut-toothed in the middle, conspicuously taper-pointed, and *rather abruptly narrowed to a long contracted entire portion, which is abruptly dilated into a conspicuously auricled base;* heads on short divergent peduncles; involucre 5–8 mm. high; bracts narrowly linear, tips recurved-spreading; rays violet. — Borders of streams and rich woods, w. N. E. to Va. and Ky., w. to Minn. and Ia. Aug.–Oct. Fig. 964.

964. A. prenanthoides.

49. **A. puníceus** L. Stem tall and stout, 0.5–2.5 m. high, rough-hairy all over or in lines, usually purple below, panicled above; flowering branches (in well developed plants) much exceeding the subtending leaves; *leaves* oblong-lanceolate or lanceolate, *not narrowed* or but slightly so *to the auricled base*, regularly and coarsely serrate to sparingly denticulate in the middle, rough above, generally hispid on the midrib beneath, pointed; heads subsessile or short-pediceled; involucre 7–12 mm. high; *bracts thin, narrowly linear, attenuate, loose, subequal*, in about 2 rows, the outer sometimes foliaceous; rays long and showy, lilac-blue to white. — Low thickets and swamps, Nfd. to Man. and Ga. Aug.–Oct. Fig. 965. Var. demíssus Lindl. Leaves elongate-lanceolate; inflorescences mostly shorter than the subtending leaves; otherwise as in the typical form. — N. E. Var. compáctus Fernald. Stout, 6–8 dm. high, conspicuously hispid; leaves sub-rhomboidal, irregularly toothed, harsh above; branches of inflorescence mostly shorter than the leaves. — Mass. to Pa. Var. fírmus (Nees) T. & G. Stem mostly green, smooth and naked below, sparsely hirsute above; leaves serrate, smooth beneath. (Var. *laevicaulis* Gray.) — Range of typical form. Var. lucídulus Gray. The very leafy stems glabrous or sparingly hispidulous; leaves lanceolate, entire or slightly denticulate, glabrous and somewhat shining; heads usually numerous, thyrsoid-paniculate; bracts less loose and less attenuate. — N. E. to Wisc. and Ill. Var. oligocéphalus Fernald. Stem essentially glabrous; leaves as in the preceding variety; heads few or solitary; outer bracts often broad and foliaceous. — Lab. and Nfd. to L. Superior and the White Mts.

965. A. puniceus.

§ 4. DOELLINGÈRIA (Nees) Gray. *Pappus manifestly double, the inner of long capillary bristles (some thickened at top), the outer of very short and rigid bristles; bracts short, without herbaceous tips; heads corymbose or solitary; rays rather few, white, rarely rose-tinged; leaves not rigid, veiny.*

50. **A. umbellàtus** Mill. Smooth or nearly so, leafy to the top, 0.3–2.5 m.

966. A. umbellatus.

high; *leaves lanceolate, elongated, taper-pointed* and tapering at the base, 1–1.5 dm. long; heads very numerous in compound flat corymbs; bracts rather close, obtusish, scarcely longer than the achenes. (*Diplopappus* Hook.; *Doellingeria* Nees.) — Moist thickets; common, especially northw. Aug., Sept. Fig. 966. Var. pùbens Gray. Lower surface of the leaves and the branchlets tomentulose. — Upper Mich. to Neb. and Man.

Var. latifòlius Gray. Leaves shorter, ovate-lanceolate to ovate, less narrowed or even rounded at base. (*Diplopappus amygdalinus* Hook.; *Doellingeria humilis* Britton.) — Pine barrens, etc., N. J., Pa., and southw.

967. A. infirmus.

51. **A. infírmus** Michx. Stem slender, often flexuous, 1 m. or less high, less leafy, bearing few or several heads on divergent peduncles; *leaves obovate to ovate or oblong-lanceolate*, narrowed at base and ciliate, the midrib hairy beneath; bracts more imbricated, thicker and more obtuse; rays sometimes creamy; pappus more rigid. (*Doellingeria* Greene; *Diplopappus cornifolius* Less.) — Open woodlands, e. Mass. to S. C. and Ala. July–Sept. Fig. 967.

968. A. linariifolius.

§ 5. IÁNTHE Gray. *Pappus less distinctly double, inner bristles not thickened at top, outer shorter; bracts well imbricated, appressed, without herbaceous tips; rays violet or rarely white; achenes narrow, villous; leaves numerous, rigid, small, linear, 1-nerved and veinless.*

52. **A. linariifòlius** L. Stems 1–6 dm. high, several from a woody root; heads solitary or terminating simple branches, rather large (1–1.2 cm. high); leaves 2–3 cm. long, rough-margined, passing above into the rigid acutish bracts. (*Diplopappus* Hook.; *Ionactis* Greene.) — Dry soil, centr. Me. to Wisc., and southw., except in the mountains. Aug.–Oct. Fig. 968.

969. A. ptarmicoides.

§ 6. ORTHÓMERIS T. & G. *Pappus simple; bracts imbricated, appressed, without herbaceous tips, often scarious-edged or dry; perennial, as all the preceding.*

970. A. acuminatus.

53. **A. ptarmicoìdes** T. & G. Smooth or roughish; stems clustered, 1.5–6 dm. high, simple; *leaves linear-lanceolate, acute, rigid*, entire, tapering to the base, 1–3-nerved, with rough margins, 0.5–1 dm. long; *heads small, in a flat corymb;* bracts imbricated in 3–4 rows, short; *rays white*, 5–8 mm. long. — Dry calcareous soil, w. N. E. and w. Que. to Man., Col., and Mo. June–Sept. Fig. 969. Var. lutéscens (Hook.) Gray. Rays small, pale yellow. — Englewood, Ill. (*Hill*); Sask.

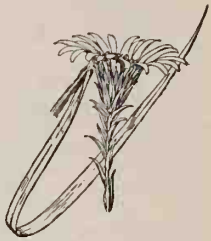
54. **A. acuminàtus** Michx. Somewhat hairy; stem 3–9 dm. high, simple, zigzag, panicled-corymbose at the summit; peduncles slender; *leaves oblong-lanceolate, conspicuously pointed, coarsely toothed* above, wedge-form and entire at the base; involucral bracts few and loosely imbricated, linear-lanceolate, pointed, thin, 0.5–1 cm. long;

heads few-several; rays 12–18, white, or slightly purple. — Cool rich woods, Lab. to Ont., Pa., and southw. along the Alleghenies. June–Sept. Fig. 970. — A monstrous form occurs in N. E. and N. Y. having a chaffy receptacle and the flowers turned to tufts of chaffy paleae.

971. A. nemoralis.

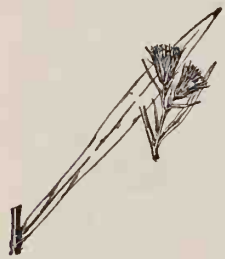
55. **A. nemoràlis** Ait. Minutely roughish-pubescent; stem slender, simple or corymbose at the summit, very leafy, 2–6 dm. high; *leaves* small (2–4 cm. long), rather *rigid*, *lanceolate*, nearly *entire*, *with revolute margins;* heads 1–3(–12); bracts of the inversely conical involucre narrowly linear-lanceolate, the outer awl-shaped; rays lilac-purple, elongated. — Bogs and swamps, Nfd. to Hudson B., s. to N. J., n. N. Y., and e. Ont., chiefly coastal. July–Sept. Fig. 971. Passing to

Var. **Blàkei** Porter. Leaves larger (1–2 cm. wide), oblong-lanceolate, toothed; heads few-many. — N. S. to N. Y. and N. J. — A very showy plant about equally related to this and the preceding species, and not clearly distinct from either.



972. A. tenuifolius.

56. **A. tenuifòlius** L. Very glabrous; stem often zigzag, simple or forked, 1.5–6 dm. high; heads rather large, 1 cm. high, terminal; *leaves few*, *long-linear*, *tapering to both ends*, *rather thick and fleshy*, *entire*, the upper subulate, pointed; involucre top-shaped, the bracts subulate-lanceolate with attenuate acute points; rays large, numerous, pale purple. — Salt marshes, Mass. to Fla. Aug.–Oct. Fig. 972.



973. A. subulatus.

§ 7. OXYTRIPÒLIUM (DC.) T. & G. *Involucre as in § 6; pappus simple, fine and soft; glabrous annuals, with numerous small heads and narrow entire leaves.*

57. **A. subulàtus** Michx. Stem 0.2–1.5 m. high; leaves linear-lanceolate, pointed, flat, on the branches awl-shaped; bracts of the subcylindric involucre (7–8 mm. high) linear-awl-shaped, in few rows; rays somewhat in two rows, short, not projecting beyond the disk, more numerous than the disk-flowers, purplish. — Salt marshes on the coast, e. N. B.; N. H. to Fla. Late July–Oct. Fig. 973.

974. A. angustus.

§ 8. CONYZÓPSIS T. & G. *Bracts of the campanulate involucre in 2–3 rows, nearly equal, linear, the outer foliaceous and loose; pappus copious, very soft; rays very short or none; low annuals, with numerous rather small heads.*

975. A. frondosus.

58. **A. angústus** (Lindl.) T. & G. Branching, 1.5–6 dm. high, nearly glabrous; *leaves linear-attenuate*, entire, more or less short-ciliate; *involucral bracts all linear, acute; corolla of the ray-flowers* reduced to a tube, *much shorter than the elongated style.* (*Brachyactis* Britton.) — Alkaline soil, lower St. Lawrence R., Que.; Minn. to Sask., and westw., spreading east to Chicago, etc Aug., Sept. (Siber.) Fig. 974.

59. **A. frondòsus** (Nutt.) T. & G. Similar; *leaves linear-oblanceolate to spatulate*, blunt, ciliolate only at base; outer involucral *bracts oblong to*

oblanceolate, wholly foliaceous; *rays* pinkish, *longer than the style.* — Saline soil, P. E. I.; Wyo. to N. Mex., and westw. July–Oct. Fig. 975.

23. ERÍGERON L. Fleabane

Heads many-flowered, radiate, mostly flat or hemispherical; the narrow rays very numerous, pistillate. Involucral bracts narrow, equal, and little imbricated, never coriaceous, neither foliaceous nor green-tipped. Receptacle flat or convex, naked. Achenes flattened, usually pubescent and 2-nerved; pappus a single row of capillary bristles, with minuter ones intermixed, or with a distinct short outer pappus of little bristles or chaffy scales. — Herbs, with entire or toothed and generally sessile leaves, and solitary or corymbed naked-pedunculate heads. Disk yellow; rays white, pink, or purple. (The ancient name presumably of a *Senecio*, from ἦρ, *spring*, and γέρων, *an old man*, suggested by the hoariness of some vernal species.)

§ 1. EUERÍGERON DC. *Rays elongated (short in a form of no. 7), crowded in one or more rows.*

* *Leafy-stemmed perennials.*

+ *Pappus double.*

1. **E. glabéllus** Nutt. Stem 1.5–4 dm. high, stout, hairy above, the leafless summit bearing 1–7 large heads; leaves nearly glabrous, except the margins, entire, the upper oblong-lanceolate and pointed, closely sessile or partly clasping, the lower spatulate and petioled; rays more than 100, purple, more than twice the length of the hoary-hispid involucre; outer pappus of minute bristles. (*E. asper* Nutt.) — Plains of n. Wisc., Man., and westw. June–Sept.

+ + *Pappus simple.*

++ *Stems slender, densely tufted, very leafy; leaves narrowly linear, entire.*

2. **E. hyssopifòlius** Michx. Slightly pubescent, 1–3 dm. high, from filiform rootstocks; branches prolonged into slender naked peduncles, bearing solitary small heads; rays 20–30, rose-purple to whitish. — Wet calcareous rocks, Nfd. and Lab. to Mackenzie, s. to N. B., Me., Vt., and Mich. June, July.

++ ++ *Stems stouter, not tufted; leaves broader, toothed.*

3. **E. pulchéllus** Michx. (Robin's Plantain.) Hairy, *producing offsets from the base; stem simple, rather naked above*, bearing few (1–9) large heads on slender peduncles; basal leaves obovate and spatulate, sparingly toothed, the cauline distant, lanceolate-oblong, partly clasping, entire; *rays (about 50) rather broad, light bluish-purple.* (*E. bellidifolius* Muhl.) — Copses and moist banks, s. Me. to Ont., Minn., and southw. Apr.–June.

4. **E. philadélphicus** L. Hairy; *stem leafy*, corymbed, bearing several small heads; leaves thin, with a broad midrib, oblong; the upper smoothish, clasping by a heart-shaped base, mostly entire; the lowest spatulate, toothed; *rays innumerable and very narrow, rose-purple* or flesh-color. — Throughout, locally common, generally in alluvial soil. May–Aug.

* * *Perennial by rosulate offsets, with scape-like stems; pappus simple.*

5. **E. vérnus** (L.) T. & G. Glabrous; leaves clustered at the base, oval or spatulate; scape leafless, slender, 3–7 dm. high, bearing 5–12 small corymbed heads; rays white. (*E. nudicaulis* Michx.) — Low grounds, e. Va., and southw. May.

* * * *Annuals (or sometimes biennials), leafy-stemmed and branching; pappus double, the outer a crown of minute scales, the inner of deciduous fragile bristles, usually wanting in the ray.*

6. **E. ánnuus** (L.) Pers. (Daisy F., Sweet Scabious.) Stem stout, 2–15 dm. high, branched, *beset with spreading hairs; leaves coarsely and sharply toothed; the lowest ovate*, tapering into a margined petiole; the upper ovate-

lanceolate, acute and entire at both ends; heads corymbed; rays white, tinged with purple, not twice the length of the bristly involucre. — Fields and waste places; a very common weed. June–Oct. (Nat. in Eu.)

7. **E. ramòsus** (Walt.) BSP. (Daisy F.) Stem panicled-corymbose at the summit, *roughish* like the leaves *with minute appressed hairs, or almost smooth; leaves entire* or nearly so, the upper *lanceolate*, scattered, the lowest oblong or spatulate, tapering into a slender petiole; rays white, twice the length of the minutely hairy involucre. (*E. strigosus* Muhl.) — Fields, etc., common. June–Oct. — Stem smaller and more simple than the preceding, with smaller heads but longer rays. Var. discoídeus (Robbins) BSP., with the rays minute, scarcely exceeding the involucre, occurs in s. N. E. and N. Y.

§ 2. CAENÒTUS Nutt. *Rays inconspicuous, in several rows, scarcely longer than the simple pappus; annuals.*

8. **E. canadénsis** L. (Horse-weed, Butter-weed.) Bristly-hairy; *stem erect, wand-like*, 0.1–3 m. high; leaves linear, mostly entire, the radical cut-lobed; *heads* very numerous and small, cylindrical, *panicled*. (*Leptilon* Britton.) — Waste places, etc., a common weed, now widely diffused over the world. July–Oct. — Ligule of the ray-flowers much shorter than the tube, white.

9. **E. divaricàtus** Michx. *Diffuse and decumbent*, 1–3 dm. high; leaves linear or awl-shaped, entire; *heads loosely corymbed; rays purple;* otherwise like no. 8. (*Leptilon* Raf.) — Ind. to Minn., Neb., and southw.

§ 3. TRIMORPHAÈA (Cass.) Reichenb. *Like* § 2, *but with a series of filiform rayless pistillate flowers within the outer row of ray-flowers; biennial or sometimes perennial.*

10. **E. àcris** L., var. **asteroìdes** (Andrz.) DC. Hirsute-pubescent or smoothish; stem erect, 2–5 dm. high; leaves lanceolate or the lower spatulate-oblong, entire; heads several or rather numerous, racemose or at length corymbose, nearly hemispherical, about 1 cm. long; involucre minutely glandular-puberulent, or somewhat hirsute toward the base; rays purplish or bluish, equaling or a little exceeding the copious pappus. (Var. *droebachensis* Blytt; *E. droebachiensis* O. F. Müll.) — Rocky banks and clearings, lower St. Lawrence, n. N. B., n. Me., L. Superior, Rocky Mts., westw. and northw. July, Aug. (Eu.)

24. SERICOCÁRPUS Nees. White-topped Aster

Heads 12–20-flowered, radiate; rays about 5, fertile, white. Involucre somewhat cylindrical or club-shaped; the bracts closely imbricated in several rows, cartilaginous and whitish, appressed, with short and abrupt often spreading green tips. Receptacle alveolate-toothed. Achenes short, inversely pyramidal, very silky; pappus simple, of numerous capillary bristles. — Perennial tufted herbs, 2–7 dm. high, with sessile somewhat 3-nerved leaves, and small heads mostly in little clusters, disposed in a flat corymb. Disk-flowers pale yellow. (Name from σηρικός, *silky*, and καρπός, *fruit*.)

* *Pappus rusty; leaves sparingly serrate, veiny, rather thin.*

1. **S. asteroìdes** (L.) BSP. Somewhat pubescent; leaves oblong-lanceolate or the lower spatulate, ciliate; heads rather loosely corymbed, obconical; involucre 5–9 mm. long. (*S. conyzoides* Nees.) — Dry ground, s. Me. to O., and southw. June–Aug.

** *Pappus white; leaves entire, obscurely veined, firmer and smaller.*

2. **S. linifòlius** (L.) BSP. *Smooth*, slender; *leaves linear*, rigid, obtuse, with rough margins, tapering to the base; heads narrow, in close clusters, few-flowered; involucre 4–7 mm. long. (*S. solidagineus* Nees.) — Thickets, s. N. E. to O., and southw. June–Aug.

3. **S. bifoliàtus** (Walt.) Porter. *Hoary-pubescent; leaves obovate or oblong-spatulate*, short (1–2.5 cm. long), vertical, both sides alike; heads rather loosely

corymbed, obovoid; involucre 6–8 mm. long. (*S. tortifolius* Nees.) — Pine woods, Va., and southw. Aug.

25. BÁCCHARIS L. Groundsel Tree

Heads many-flowered; flowers all tubular, dioecious, *i.e.* the pistillate and staminate borne by different plants. Involucre imbricated. Corolla of the pistillate flowers very slender and thread-like; of the staminate larger and 5-lobed. Anthers tailless. Achenes ribbed; pappus of capillary bristles, in the staminate plant scanty and tortuous, in the pistillate very long and copious. — Shrubs, commonly smooth and resinous or glutinous. Flowers whitish or yellow. (Name of some shrub anciently dedicated to *Bacchus*.)

1. B. halimifòlia L. Glabrous but somewhat scurfy, 1–3 m. high; branches angled; leaves obovate and wedge-form, petiolate, coarsely toothed, or the upper entire; *heads scattered at the ends of the branches, forming pyramidal panicles*; involucre 5–6 mm. high; bracts acutish. — Sea beaches and marshes, Mass. to Va., and southw. — The fertile plant conspicuous in autumn by its very long (1–1.5 cm.) white pappus.

2. B. glomeruliflòra Pers. Brighter green; *heads* of both kinds *sessile or nearly so in the axils*, forming glomerules; otherwise much like the preceding — N. C. to Fla.; said to reach s. Va. (Bermuda.)

26. PLÙCHEA Cass. Marsh Fleabane

Heads many-flowered; the flowers all tubular, the central perfect but sterile, few, with a 5-cleft corolla; all the others with a thread-shaped truncate corolla, pistillate and fertile. Involucre imbricated. Receptacle flat, naked. Anthers with tails. Achenes grooved; pappus in a single row. — Herbs, somewhat glandular, emitting a strong or camphoric odor, the heads cymosely clustered. Flowers purplish, in summer. (Dedicated to the *Abbé Pluche*, French naturalist of the 18th century.)

1. P. foétida (L.) DC. *Perennial*, 5–9 dm. high; *leaves closely sessile or half-clasping*, oblong to lanceolate, sharply denticulate, veiny, only 5–8 cm. long; heads clustered in a corymb; bracts lanceolate. (*P. bifrons* DC.) — Low ground, N. J., and southw.

2. P. camphoràta (L.) DC. (Salt Marsh Fleabane.) *Annual, pale*, 3–15 dm. high; *leaves slightly petioled*, oblong-ovate or lanceolate, thickish, obscurely veiny, subentire or serrate; corymb flat; heads 5–9 mm. high; involucral bracts ovate to lanceolate, puberulent. — Salt marshes, Mass. to Va., and southw.

3. P. petiolàta Cass. *Greener* and smoother; leaves slender-petioled, more finely and sharply serrate; *heads smaller; bracts merely granular.* — Moist soil, Md. to Ill., Kan., and southw.

27. GÍFOLA Cass. Cotton Rose

Heads rather many-flowered, discoid; flowers as in *Pluchea*, the central usually sterile. Receptacle elongated or top-shaped; the chaff resembling the proper involucral bracts, each scale covering a single pistillate flower. Achenes terete; pappus of the central flowers capillary, of the outer ones mostly none. — Annual, with entire leaves, and small heads in capitate clusters. (Name an anagram of *Filago*, the name of a related genus.)

1. G. germánica (L.) Dumort. (Herba Impia.) Stem erect, short, clothed with lanceolate upright crowded leaves, and producing a capitate cluster of woolly heads, from which rise one or more branches, each terminated by a similar head, and so on; — hence the common name applied to it by the old botanists, as if the offspring were undutifully exalting themselves above the parent. (*Filago* L.) — Dry fields, N. Y. to Va. July–Oct. (Nat. from Eu.)

28. ANTENNÀRIA Gaertn. EVERLASTING. LADIES' TOBACCO. PUSSY'S TOES

Heads many-flowered, dioecious; flowers all tubular; pistillate corollas very slender. Involucre dry and scarious, white or colored, imbricated. Receptacle convex or flat, not chaffy. Anthers caudate. Achenes terete or flattish; pappus a single row of bristles, in the fertile flowers capillary, united at the base so as to fall in a ring, and in the sterile thickened and club-shaped or barbellate at the summit. — Perennial white-woolly herbs, with entire leaves and corymbose or racemose (rarely single) heads. Corolla whitish. Staminate plants smaller than the pistillate, abundant only in nos. 3, 9, and 10, though occasionally found in most of the others; many species parthenogenetic or apogamous. Involucral bracts of the staminate heads with broad white petaloid tips. (Name from the resemblance of the sterile pappus to the *antennae* of certain insects.)

N.B. — The figures in this genus are on a scale of $\frac{2}{3}$.

* *Stolons assurgent*, i.e. *decumbent at base but with definitely ascending tips, rather leafy throughout, but with the terminal leaves much the larger.* (*In shade the stolons elongating and suggesting those of the last group.*)

+ *Basal leaves and those at the tips of the stolons bright green above, glabrous from the first, or at most only a little arachnoid when young and soon quite glabrate.*

++ *Basal leaves large, 5–12 cm. long, broadly obovate or obovate-spatulate, obtuse or rounded at tip, definitely 3-nerved.*

976. A. Parlinii

1. **A. Parlínii** Fernald. Stout and tall, becoming 3–5 dm. high; *the stem, stolons, and stem-leaves bearing purplish glandular hairs;* lower stem-leaves crowded, oblong or oblong-lanceolate, obtuse or acutish; heads of the pistillate plant loosely or densely corymbose; involucre 8–10.5 mm. high, of about 3 rows of bracts; *styles becoming crimson.* (*A. arnoglossa* Greene.) — Rich soil, often in open woods, N. E. to Ia. and D.C. May–July. FIG. 976.

++ ++ *Basal leaves small, generally less than 5 cm. long, spatulate to oblanceolate, acute or obtuse, only 1 nerve prominent.*

A. DIOÍCA (L.) Gaertn. Low (1.5 dm. or less high); *basal leaves rarely 2 cm. long; stem-leaves crowded;* heads subsessile, subglomerulate; *bracts* of pistillate heads *rose-color*, the outer oblong and obtuse, the inner acutish. — Found "in woods" at Providence, R. I., by *Geo. Thurber* in 1844, but not since collected; probably a casual introduction.

977. A. canadensis.

2. **A. canadénsis** Greene. *Forming broad mats;* stems slender, becoming 3–5 dm. high; *basal leaves generally more than 2 cm. long; stem-leaves scattered;* heads loosely corymbose; involucre of the pistillate head 7–11 mm. long; staminate heads smaller, their bracts with broad white petaloid tips; *styles pale, drying brownish.* — Dry mostly open soil, Nfd. to Man., s. to Ct., centr. N. Y., and Mich. May–July. FIG. 977.

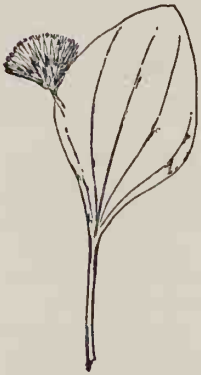
+ + *Basal leaves and those at the tips of the stolons dull above, invested with tomentose or arachnoid pubescence, only the very oldest becoming glabrate.*

++ *Basal leaves mostly long, 5–12 (in reduced specimens rarely 4.5) cm. in length* (*Large specimens of no. 7 might be looked for here.*)

= *Heads comparatively small, the involucre averaging 7 (6–8) mm. high; stems slender.*

3. **A. plantaginifòlia** (L.) Richards. (PLANTAIN-LEAVED E.) Stems 1–5

dm. high; basal leaves from broadly obovate with rounded tips to oblanceolate and acutish, distinctly 3-nerved; stem-leaves scattered, lanceolate, acuminate; heads loosely or densely corymbose; bracts of the pistillate heads linear, purplish or green, with pale tips; *styles crimson.* (*A. plantaginea* R. Br.) — Dry soil, s. Me. to Minn., and southw. Apr.–June.



978. A. fallax.

= = *Heads comparatively large, averaging* 9 (8–10.5) *mm. high; stems stoutish.*

a. Basal leaves mostly broad-obovate or rhombic-obovate, narrowed from near the middle to the acutish or blunt tip.

4. **A. fállax** Greene. Stems 1–4 dm. high, sometimes slightly glandular; *basal leaves* large, the mature ones 2–5 *cm. broad;* lower stem-leaves oblong-lanceolate, rather crowded; corymb rather dense; bracts of the pistillate head attenuate to scarious tips or broad and somewhat petaloid; *styles pale, sometimes crimson.* (*A. ambigens* Fernald.) — Rich open woods and fields, centr. Me. to Minn., and southw. May, June. Fig. 978.

979. A. occidentalis.

b. Basal leaves from spatulate to narrowly spatulate-obovate, with rounded tips.

5. **A. occidentàlis** Greene. Stout; the stem at first low, becoming 2.5–4 dm. high; *basal leaves* 1–2.5 *cm. broad;* stem-leaves lanceolate to oblanceolate, rather conspicuous; inflorescence subcapitate; bracts lanceolate to oblong, with conspicuous white tips; *styles crimson.* (*A. Farwellii* Fernald, not Greene.) — Rich open soil, e. Que. to Minn., s. to s. w. Me., s. N. H., w. Mass., N. Y., and Ill. May, June. Fig. 979.

↔ ↔ *Basal leaves small,* 2–5 *cm. long.* (*Nos.* 10 *and* 11 *with poorly developed stolons might be sought here.*)

= *Basal leaves spatulate, with little or no distinction of blade and petiole.*

980. A. rupicola.

6. **A. rupícola** Fernald. Stems slender, 1.5–3 dm. high; stolons very numerous and short, forming dense mats; basal leaves mucronate, 1–4 cm. long; *stem-leaves numerous* (10–18), linear-attenuate, *the upper dark green, strongly contrasting with the white-pubescent stem; corymb compact;* involucre of pistillate plant 8–10 mm. high; *bracts with* conspicuous *long yellowish-white firm papery tips; styles pale.* — Slaty ledges by the Mattawamkeag R., Me. June. Fig. 980.

= = *Basal leaves with more distinct petioles and obovate blades.*

a. Stem bearing purplish glandular hairs; basal leaves 3-nerved.

981. A. Brainerdii.

7. **A. Brainérdii** Fernald. Stem slender, 2–3 dm. high; *basal leaves obovate or orbicular-obovate,* 1–2 *cm. broad;* stem-leaves remote, small; corymb rather loose; involucre 6–8 mm. high; bracts white-tipped, the outer blunt, the inner attenuate; *styles crimson.* — Rich meadows and open woods, s. Me., Vt., and e. N. Y. May, June. Fig. 981.

b. Stem glandless; basal leaves 1-nerved.

982. A. neodioica.

8. A. neodioíca Greene. Forming broad mats; stems slender, 0.5–4 dm. high; *basal leaves obovate*, 5–18 *mm. broad; stem-leaves* scattered, *few* (5–10), rather small and inconspicuous, linear-attenuate, 3 mm. or less wide; corymbs ordinarily loose; involucre 6–9 mm. high; bracts with scarious blunt or acute tips; *styles pale.* — Open woods, fields, etc., Nfd. to w. Ont., S. Dak., and Va. May–July. Fig. 982.

Var. grándis Fernald. Stouter throughout, greener; stems 3–5 dm. high; stem-leaves oblanceolate or oblong-lanceolate, more conspicuous, 5–8 mm. broad; bracts with white petaloid tips. — Woods and meadows, e. Me. to Mass. and n. N. Y.

** * Stolons, when well developed, procumbent, bracteate, not leafy except at tip.*

← Heads solitary; basal leaves 1.5 cm. or more broad.

9. A. solitària Rydb. Stems 0.5–2 dm. high, very slender; *stolons flagelliform; basal leaves obovate-spatulate*, 4.5–7 *cm. long*, 1.5–3.5 *cm. broad*, tomentose beneath, arachnoid, becoming glabrate above, 3-*nerved;* stem-leaves few, small, appressed; involucre 1 cm. high, its bracts linear-attenuate; styles crimson. — Rich wooded slopes, Pa. and O. to Ga. and La. Apr., May.

← ← Heads more than 1 (solitary in a rare variety of no. 10, which has leaves less than 1.5 cm. broad).

↔ Heads sessile or subsessile in capitate clusters or distinctly racemose; styles crimson.

983. A. neglecta.

10. A. neglécta Greene. Stems 0.3–4 dm. high, slender, becoming much elongated in fruit; *stolons flagelliform;* basal leaves from cuneate-spatulate to spatulate-obovate, 4 (rarely 5) cm. or less long; stem-leaves few and scattered; *heads at first crowded, later becoming racemose by the development of the rhachis; involucre* 7–9 mm. high, frequently *purple-tinged at base;* bracts of pistillate heads with linear whitish tips, of the staminate heads with broad white petaloid tips. — Fields, plains, and open woods, N. B. to Va., w. to Ia. and Kan. Apr., May. Fig. 983. Var. símplex Peck. Stems stiffly erect, terminated by solitary heads. — Sand Lake, N. Y.

↔ ↔ Heads in a comparatively loose corymb, never racemose; styles pale, drying brownish.

984. A. petaloidea.

11. A. petaloídea Fernald. *Stouter* than no. 10; stems 2–4.5 dm. high; *stolons* generally shorter and rather *stiffer;* basal leaves spatulate-obovate to oblanceolate; *involucres* of the pistillate heads *brown or green at base*, their bracts with petaloid or scarious tips. — Fields, dry banks, and open woods, e. Que. to Ont., s. to n. and w. N. E., N. Y., and Mich. May–July. Fig. 984.

29. ANÁPHALIS DC. Everlasting

Characters of *Antennaria*, but the pappus in the sterile flowers not thickened at the summit or scarcely so, and that of the fertile flowers not at all united at base; fertile heads usually with a few perfect but sterile flowers in the center. (Said to be an ancient Greek name of some similar plant.)

1. A. margaritàcea (L.) B. & H. (Pearly E.) Stem erect, 2–9 dm high,

corymbose at the summit, with many heads, leafy; leaves linear-lanceolate, taper-pointed, sessile, tomentose on both surfaces, finally dull green above; involucral bracts pearly-white, very numerous, obtuse or rounded, radiating in age. — Dry hills, woods, and recent clearings; common northward. July, Aug. (Asia.)

Var. **occidentàlis** Greene. Leaves broadly lanceolate, bright green and glabrous above from the first. — Gravelly or sandy soil, Nfd. and e. Que.; Alaska to Cal.

30. GNAPHÀLIUM L. Cudweed

Heads many-flowered; flowers all tubular, the outer pistillate and very slender, the central perfect. Bracts of the involucre dry and scarious, white or colored, imbricated in several rows. Receptacle flat. Achenes terete or flattish; pappus a single row of rough bristles. — Woolly herbs, with sessile or decurrent leaves, and clustered or corymbed heads; fl. in summer and autumn. Corolla whitish or yellowish. (Γναφάλιον, ancient Greek name of some downy plant, from κνάφαλον, *a lock of wool.*)

§ 1. EUGNAPHÀLIUM B. & H. *Bristles of the pappus distinct.*

* *Tall erect annuals or biennials, with smooth achenes.*

1. **G. polycéphalum** Michx. (Common Everlasting.) Erect woolly annual, 3–9 dm. high, fragrant; *leaves lanceolate, tapering at the base*, undulate, *not decurrent*, smoothish above; *heads clustered at the summit of panicled-corymbose branches*, ovoid-conical before expansion, then obovoid; bracts whitish, ovate and oblong, rather obtuse; perfect flowers few. (*G. obtusifolium* L.?) — Old fields and woods, common.

Var. **Hellèri** (Britton) Fernald. Stems glandular-viscid, not tomentose. (*G. Helleri* Britton.) — N. Y. to Va., Ky., and southw.

2. **G. decúrrens** Ives. (Everlasting.) Stout, erect, 6–9 dm. high, annual or biennial, branched at the top, clammy-pubescent, white-woolly on the branches, bearing numerous *heads in dense corymbed clusters; leaves linear-lanceolate, partly clasping, decurrent;* bracts yellowish-white, oval, acutish. — Clearings, etc., e. Que. to B. C., s. to Pa., O., Mich., Minn., and in the Rocky Mts. to Ariz.

** *Low chiefly diffuse or tufted plants, with smooth or scabrous achenes.*

3. **G. uliginòsum** L. (Low C.) Diffusely branched or subsimple appressed-woolly annual, 0.5–3 dm. high; leaves spatulate-oblanceolate or linear, not decurrent; *heads small, in terminal sessile capitate clusters* subtended by leaves; bracts brownish, less imbricated. — Ditches, roadsides, etc., Nfd. to Sask., s. to Va., and the Great L. region. (Eu.)

4. **G. supìnum** L. (Mountain C.) Dwarf and tufted perennial, 1 dm. or less high; leaves linear, woolly; heads solitary or few and spiked on the slender simple flowering stems; bracts brown, lanceolate, acute, nearly glabrous; achenes broader and flatter. — Alpine summits of Mt. Katahdin, Me., Mt. Washington, N. H., and high northw. (Eu.)

§ 2. GAMOCHAÈTA (Weddell) B. & H. *Bristles of the pappus united at the very base into a ring, so falling off all together; achenes hispidulous.*

* *Strict perennial, with mostly simple stems and narrow acute leaves.*

5. **G. sylváticum** L. *Silvery-silky*, slender, 1–5 dm. high, leafy; *leaves linear or oblanceolate*, the lower often glabrate above, the broadest barely 5 mm. wide; heads abundant in an *elongated leafy spiciform inflorescence;* involucral bracts linear-oblong, pale, with *a brown spot below the hyaline tip.* — Clearings and open places, Gaspé Co., Que., to n. Me., N. B., and N. S. (Eu.)

** *Simple or branching annual or biennial, with broad obtuse spatulate leaves.*

6. **G. purpùreum** L. (Purplish C.) Ascending, 0.5–6 dm. high, silvery-canescent with dense white wool; leaves not decurrent, green above; heads in sessile clusters in the axils of the upper leaves, and spiked at the wand-like

summit of the stem; bracts tawny, the inner often marked with purple. — Sandy or gravelly soil, coast of s. Me. to Fla.; and from O. to Kan., and southw. (Trop. Am.)

31. ÍNULA L. Elecampane

Heads many-flowered, radiate; disk-flowers perfect and fertile. Involucre imbricated, hemispherical, the outer bracts herbaceous or leaf-like. Receptacle naked. Anthers caudate. Achenes more or less 4–5-ribbed; pappus simple, of capillary bristles. — Coarse herbs, not floccose-woolly, with alternate simple leaves, and large yellow heads. (The ancient Latin name.)

1. I. Helènium L. (Elecampane.) Stout perennial, 1–1.5 m. high; leaves large, woolly beneath; those from the thick root ovate, petioled, the others partly clasping; rays very many, narrow. — Roadsides and damp pastures. Aug. — Heads very large. Root mucilaginous. (Nat. from Eu.)

32. ADENOCAÚLON Hook.

Heads 5–10-flowered; the flowers all tubular and with similar corollas, the marginal flowers pistillate, fertile; the others perfect but sterile. Involucral bracts equal, in 1 row. Receptacle flat, naked. Anthers caudate. Achenes elongated at maturity, club-shaped, beset with stalked glands above; pappus none. — Slender perennials, with alternate thin petioled leaves smooth and green above, white-woolly beneath, and few small (whitish) heads in a loose panicle, beset with glands (whence the name, from *ἀδήν*, *a gland*, and *καυλός*, *a stem*).

1. A. bícolor Hook. Stem 3–9 dm. high; leaves triangular, rather heart-shaped, with angular-toothed margins; petioles margined. — Moist woods, shores of L. Huron, L. Superior, and westw.

33. POLÝMNIA L. Leafcup

Heads broad, many-flowered; rays several (rarely abortive), pistillate; disk-flowers perfect but sterile. Involucral bracts in two rows; the outer large, spreading; the inner membranaceous, partly embracing the thick achenes. Receptacle flat, membranous-chaffy. Pappus none. — Tall branching perennials, viscid-hairy, exhaling a heavy odor. Leaves large, thin, opposite, or the uppermost alternate, lobed, with dilated appendages at the base. Heads in panicled corymbs. Flowers light yellow, in summer and autumn. (Dedicated to the Muse, *Polyhymnia*, for no obvious reason.)

1. P. canadénsis L. *Clammy-hairy*, 0.5–1.5 m. high; lower leaves deeply pinnatifid, the uppermost triangular-ovate and 3–5-lobed or -angled, petioled; heads small; *rays* 5, *obovate or wedge-form*, *shorter than the involucre*, usually minute or abortive, whitish-yellow, but sometimes (var. radiàta Gray) more developed, 3-lobed, 1 cm. long, and whitish; achenes 3-costate, not striate. — Moist shaded ravines, w. Vt. to Ont., Minn., southw. and southwestw.

2. P. uvedàlia L. *Roughish-hairy*, *stout*, 1–3 m. high; leaves broadly ovate, angled and toothed, nearly sessile; the lower palmately lobed, abruptly narrowed into a winged petiole; outer involucral bracts very large; *rays* 10–15, *linear-oblong*, *much longer than the inner bracts of the involucre*, yellow; achenes strongly striate. — Rich soil, N. Y. to Mo., and southw.

34. ACANTHOSPÉRMUM Schrank

Heads small, axillary or subsessile in the forks of the stem. Ray-flowers few, fertile; the ligules small, yellow, usually 3-dentate; the disk-flowers with campanulate yellow 5-toothed corolla, sterile. Involucre double, the outer bracts herbaceous, the inner more or less strongly modified, closely enveloping the fertile ray-achenes, muricate or prickly. — Diffuse annuals with opposite toothed or lobed leaves. (Name from *ἄκανθα*, *a thorn*, and *σπέρμα*, *seed*, from the prickly fruit formed by the achene and its investing bract.)

1. A. AUSTRÀLE (Loefl.) Ktze. Sordid-pubescent; leaves ovate or obovate, 1.5–2.5 cm. long, toothed above the middle, and cuneately narrowed at the entire base to a short but slender petiole; bristly fruits 5, stellate-divaricate, 8–10 mm. long. — S. C. to Fla. and La.; extending northw. (according to Harper) to s. Va., where presumably of recent introduction; also sporadically adventive northeastw. (Trop. Am.)

35. SÍLPHIUM L. ROSIN-WEED

Heads many-flowered; rays numerous, pistillate and fertile, their broad flat ovaries imbricated in 2–3 rows; disk-flowers apparently perfect but with entire style and sterile. Bracts of the broad and flattish involucre broad and with loose leaf-like summits, except the innermost, which resemble the linear chaff of the flat receptacle. Achenes broad and flat, dorsally compressed, surrounded by a wing notched at the top, without pappus or with 2 teeth confluent with the winged margins, the achene and its subtending chaff usually falling together; achenes of the disk sterile and stalk-like. — Coarse and tall perennial herbs, with copious resinous juice, and large corymbose-panicled yellow-flowered heads. (Σίλφιον, the ancient name of some resinous plant, transferred by Linnaeus to this genus.)

* *Stem terete, alternate-leaved; root very large and thick.*

1. S. laciniàtum L. (ROSIN-WEED, COMPASS PLANT.) *Rough-bristly throughout;* stem stout, 1–3.5 m. high, leafy; *leaves pinnately parted*, petioled but dilated and clasping at the base; *their divisions lanceolate or linear*, acute, *cut-lobed or pinnatifid*, rarely entire; heads few, 0.5–1 dm. broad, sessile or short-peduncled along the naked summit; *bracts ovate, tapering into long and spreading rigid points;* achenes broadly winged and deeply notched, 1–4 cm. long. — Prairies, Mich. to N. Dak., and southw. July–Sept. — Lower and root-leaves vertical, 3–9 dm. long, ovate in outline, on the wide open prairies disposed to present their edges north and south; hence the name *Compass Plant.*

2. S. terebinthinàceum Jacq. (PRAIRIE DOCK.) *Stem smooth, slender*, 1–3 m. high, panicled at the summit and bearing several–many large heads, leafless except toward the base; *leaves ovate* and ovate-oblong, somewhat heart-shaped, *serrate-toothed*, thick, rough especially beneath, 3–6 dm. long, on slender petioles; *scales roundish, obtuse*, smooth; achenes narrowly winged, slightly notched and 2-toothed. Var. PINNATÍFIDUM (Ell.) Gray. Leaves deeply cut or pinnatifid. — Prairies and oak-openings, Ont. and O. to Minn., and southw. July–Sept.

** *Stem terete or slightly 4-angled, leafy; leaves undivided, not large, some opposite.*

3. S. trifoliàtum L. *Stem smooth, often glaucous*, rather slender, 1–2 m. high, branched above; *stem-leaves lanceolate, pointed, entire* or scarcely serrate, rough, *short-petioled, in whorls of* 3 *or* 4, the uppermost opposite; heads loosely panicled; achenes rather broadly winged, sharply 2-toothed at the top. — Dry plains and banks, Pa. to s. Ont., and southw. July–Sept.

4. S. Asterìscus L. *Stem hispid*, about 1 m. high; *leaves opposite, or the lower rarely in whorls of* 3, *the upper alternate, oblong or oval-lanceolate, coarsely toothed,* rarely entire, *rough-hairy*, the lower short-petioled; heads nearly solitary, large, squarrose; achenes obovate, winged, 2-toothed, the teeth usually awn-like. — Dry sandy soil, "Md." and Va. to Mo., and southw. Var. LAEVICAÚLE DC. Stem nearly or quite smooth. — Va., and southw.

5. S. integrifòlium Michx. *Stem smooth or rough*, rather stout, 0.5–1.5 m. high, rigid, 4-angular and grooved; *leaves all opposite, rigid, lanceolate-ovate*, entire or denticulate, tapering to a sharp point *from a roundish heart-shaped and partly clasping base*, rough-pubescent or nearly smooth, thick, 8–12 cm. long; heads in a close forking corymb, short-peduncled; achenes broadly winged, deeply notched. — Prairies, Mich. to Minn., Neb., and southw. Aug.

*** *Stem square; leaves opposite, connate, 1.5–3.5 dm. in length.*

6. **S. perfoliàtum** L. (Cup Plant.) Stem stout, often branched above, 1–2.5 m. high, leafy; leaves ovate, coarsely toothed, the upper united by their bases and forming a cup-shaped disk, the lower abruptly narrowed into winged petioles which are connate by their bases; heads corymbose; bracts ovate; achenes winged and variously notched. — Rich soil, Ont. to S. Dak., and southw., common; also escaped from gardens eastw. July–Sept.

36. BERLANDIÈRA DC.

With the characters of *Silphium*, but the 5–12 fertile ray-flowers in a single series. Involucral bracts in about 3 series, thinner; the inner dilated, obovate, exceeding the disk; the outer smaller and more foliaceous. Achenes without pappus, obovate, neither winged nor notched at the apex, deciduous with the subtending bract and 2–3 scales of the chaff. — Alternate-leaved perennials of the Southern and Southwestern States; head pedunculate. (Named for *J. L. Berlandier*, a Swiss botanist who collected in Texas and Mexico.)

1. **B. texàna** DC. Hirsute-tomentose or villous, 6–9 dm. high, very leafy; leaves crenate, the radical oblong, petiolate, the cauline oblong-cordate to subcordate-lanceolate, the upper closely sessile; heads somewhat cymose, 3–4 cm. broad. — Mo. and Kan., southw. and southwestw.

37. CHRYSÓGONUM L.

Heads many-flowered, radiate; rays about 5, pistillate and fertile; the disk-flowers perfect but sterile. Involucre of about 5 outer leaf-like oblong bracts which exceed the disk, and as many interior shorter and chaff-like concave scales. Receptacle flat, with a linear scale to each disk-flower. Achene obovate, obcompressed, 4-angled, partly inclosed by the short subtending involucral bract; pappus a small chaffy 2–3-toothed crown. — A hairy perennial herb, with opposite long-petioled leaves, and solitary long-peduncled heads of yellow flowers, nearly stemless when it begins to flower, the flowerless shoots forming runners. (The Greek name of some plant, composed of χρυσός, *golden*, and γόνυ, *knee*.)

1. **C. virginiànum** L. Usually low (0.5–3.5 dm. high); leaves ovate, mostly obtuse, crenate, rarely somewhat cordate, or the radical obovate with cuneate base; rays 1–1.5 cm. long. — Dry soil, s. Pa. to Fla. May–Aug. Var. dentàtum Gray. Leaves deltoid-ovate, acute, coarsely dentate-serrate; involucral scales more acute. — High Island at the Falls of the Potomac.

38. PARTHÈNIUM L.

Heads many-flowered, inconspicuously radiate; ray-flowers 5, with very short and broad obcordate ligules not projecting beyond the woolly disk, pistillate and fertile; disk-flowers staminate, with imperfect styles, sterile. Involucre hemispherical, of 2 ranks of short ovate or roundish bracts. Receptacle conical, chaffy. Achenes only in the ray, surrounded by a slender callous margin, crowned with the persistent ray-corolla. — Leaves alternate. Heads small, corymbed; the flowers whitish. (An ancient name of some plant, from παρθένος, *virgin*.)

* *Upper leaves sessile, but not auricled.*

1. **P. integrifòlium** L. Scabrous perennial, 1 m. or less high, *from a thickened rootstock;* the *stems glabrous below, minutely puberulent above;* leaves oblong or ovate, crenate-toothed, or the lower (0.5–1.5 dm. long) cut-lobed below the middle; heads many in a very dense flat corymb. — Dry soil, Md. to Minn., and southw. June–Aug.

2. **P. rèpens** Eggert. Similar but lower, *from a slender stoloniferous rootstock; stems and leaves pilose-hispid;* heads few, rather larger. — Barrens, Mo. and Kan. to Tex May, June.

* * *Stem-leaves auriculate-clasping.*

3. **P. auriculàtum** Britton. Rootstock very thick and tuber-like; stem 4–7 dm. high, villous; some of the leaves pinnatifid at base, pubescent on the veins beneath with conspicuous appressed strongly divergent hairs. — Mts. of Va.

39. ÌVA L. Marsh Elder. Highwater-shrub

Heads several-flowered, not radiate; pistillate and staminate flowers in the same heads, the former few and marginal. Anthers nearly separate. Bracts of the involucre few, roundish. Receptacle small, with narrow chaff among the flowers. Achenes obovoid or lenticular; pappus none. — Herbaceous or shrubby coarse plants, with thickish leaves (the lower opposite) and small nodding greenish-white heads of flowers; in summer and autumn. (Name of unknown derivation.)

§ 1. EUÌVA Hoffm. *Heads spicate or racemose in the axils of leaves or leaf-like bracts; fertile flowers with evident corolla.*

1. **I. orària** Bartlett. *Shrubby at base, nearly smooth,* 5–10 dm. high; *leaves oval* or lanceolate, *coarsely and sharply toothed,* fleshy, the upper reduced to linear bracts, in the axils of which the heads (5–6 mm. in diameter) are disposed in leafy panicled racemes; fertile flowers and *bracts of involucre* 5. (*I. frutescens* Man. ed. 6, not L.) — Salt marshes, coast of Mass. to Md.

2. **I. imbricàta** Walt. *Suffruticose,* glabrous, simple, 3–6 dm. high; *leaves* alternate, fleshy, *spatulate-oblong or lanceolate, entire* or slightly serrate; *heads* 6–8 *mm. high; hemispherical involucre of* 6–9 *bracts,* the outer orbicular. — Sandy coast, Va., and southw.

3. **I. ciliàta** Willd. *Annual,* 3–6 dm. high, *rough and hairy; leaves* ovate, pointed, coarsely toothed, *downy beneath, on slender ciliate petioles;* heads in dense spikes, with conspicuous ovate-lanceolate rough-ciliate bracts; bracts of the involucre and fertile flowers 3–5. — Moist ground, Ill. to Neb., and southw.; occasionally on dumps, etc., eastw.

§ 2. CYCLACHAÈNA (Fresenius) Gray. *Heads in panicled spikes, scarcely bracteate; corolla of the 5 fertile flowers a mere rudiment or none.*

4. **I. xanthifòlia** Nutt. Annual, tall, roughish; leaves nearly all opposite, hoary with minute down, ovate, rhombic, or the lowest heart-shaped, doubly or incisely toothed, or obscurely lobed; heads small, crowded, in axillary and terminal panicles. — Ont. and Mich. to Assina., Kan., westw. and southwestw.; locally established eastw.

40. AMBRÒSIA [Tourn.] L. Ragweed

Fertile heads 1–3 together, sessile in axils of leaves or bracts, at the base of racemes or spikes of sterile heads. Sterile involucres flattish or top-shaped, of 7–12 united bracts, containing 5–20 staminate flowers, with or without slender chaff intermixed. Anthers almost separate. Fertile involucre (fruit) ellipsoid, obovoid, or top-shaped, closed, pointed, resembling an achene and inclosing a single flower; elongated style-branches protruding. Achenes ovoid. — Coarse homely weeds, with opposite or alternate lobed or dissected leaves, and inconspicuous greenish flowers, in late summer and autumn; ours annuals, except the last. (The Greek and later Latin name of several plants, as well as of the food of the gods.)

§ 1. *Sterile heads sessile in a dense spike, the top-shaped involucre extended on one side into a large lanceolate hooded bristly-hairy tooth or appendage; fertile involucre ellipsoid or ovoid and 4-angled.*

1. **A. bidentàta** Michx. Hairy, 3–9 dm. high, very leafy; leaves alternate, lanceolate, partly clasping, nearly entire, except a short lobe or tooth on each side near the base; fruit with 4 stout spines and a central beak. — Prairies of Ill. to Kan., and southw.

§ 2. *Sterile heads in single or panicled racemes or spikes, the involucre regular.*

* *Leaves opposite, only once lobed; sterile involucre 3-ribbed on one side.*

2. **A. trífida** L. (Great R.) Stem stout, 1–6 m. high, rough-hairy, as are the large deeply 3-lobed leaves, the lobes oval-lanceolate and serrate; petioles margined; fruit obovoid, 5–6-ribbed and tubercled. — Rich soil, common westw. and southw., much less so northeastw. Var. integrifòlia (Muhl.) T. & G. Smaller, with the upper leaves (or all of them) undivided, ovate or oval. — Same habitat, not rare.

** *Leaves all once or twice pinnatifid, many of them alternate.*

3. **A. artemisiifòlia** L. (Roman Wormwood, Hog-weed, Bitter-weed.) Much branched, 0.3–2.5 m. high, hairy or roughish-pubescent; *leaves thin, bipinnatifid*, smoothish above, paler or hoary beneath; *fruit* obovoid or globular, *armed with about 6 short acute teeth or spines.* — Roadsides, etc., very common. — Extremely variable, with finely cut leaves, those of the flowering branches often undivided; rarely the spikes all fertile.

4. **A. psilostàchya** DC. Paniculately branched perennial, 5–15 dm. high, with slender running rootstocks, rough and somewhat hoary with short stiffish hairs; *leaves once pinnatifid, thickish*, the lobes acute, those of the lower leaves often incised; *fruit* obovoid, *pubescent*, the *tubercles absent or small.* — Prairies and plains, Ill. and Wisc. to the Saskatchewan, westw. and southwestw.

41. FRANSÈRIA Cav.

Sterile and fertile heads separate as in *Ambrosia*, or sometimes mixed in the inflorescence. Fertile involucre 1–4-celled, with a single pistil in each cell, armed with spines in more than 1 series, bur-like. — Herbs (with us) or shrubs, with mostly alternate leaves, flowering in late summer and autumn. (Named for *Antonio Franseri*, Spanish botanist and contemporary of Cavanilles.) Gaertneria Medic.

1. **F. tomentòsa** Gray. *Perennial, white with sericeous tomentum;* leaves pinnately 3–7-parted; segments lanceolate, mostly serrate, the basal ones small; sterile racemes 1–many; *spines* of fertile involucre mostly *uncinate-tipped.* (*Gaertneria* Ktze.) — Low ground, Neb., Kan., and Col.

2. **F. acanthicárpa** (Hook.) Coville. *Annual, hispid-hirsute*, erect or diffuse, loosely branched; leaves bipinnatifid; *spines* of the fertile involucre 4–5 *mm. long*, stramineous, *flattened*, the tip usually straight. (*Gaertneria* Britton.) — "Minn.," Sask., and southwestw.

42. XÁNTHIUM [Tourn.] L. Cocklebur. Clotbur

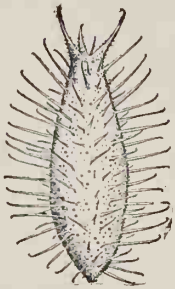
Sterile and fertile flowers in different heads, the latter clustered below, the former in short spikes or racemes above. Sterile involucres and flowers as in *Ambrosia*, but the bracts separate and receptacle cylindrical. Fertile involucre coriaceous, ovoid or ellipsoid, clothed with hooked prickles so as to form a rough bur, 2-celled, 2-flowered; the flower consisting of a pistil and slender thread-form corolla. Achenes oblong, flat. — Coarse annuals, with branching stems, and alternate toothed or lobed petioled leaves; flowering in summer and autumn. (Greek name of some plant used to dye the hair; from *ξανθός, yellow.*)

N. B. — The figures in this genus represent the mature fertile involucre × 1⅓.

Leaves attenuate to both ends, with triple spines at base . . . . . 1. *X. spinosum.*
Leaves cordate or ovate; axils unarmed.
  Body of mature bur fusiform-ellipsoid, more than twice as long as thick.
    Beaks of bur straight or nearly so; prickles relatively few . . . . 2. *X. canadense.*
    Beaks of bur incurved or hooked; prickles very numerous.
      Prickles 3–6 mm. long, shorter than the diameter of the body . . . 3. *X. commune.*
      Prickles 8–10 mm. long, exceeding the diameter of the body.
        Prickles crowded, weak, filiform, conspicuously hairy . . . . 4. *X. speciosum.*
        Prickles more rigid, merely granular or obscurely puberulent . . 5. *X. inflexum.*
  Body of mature bur thick-ovoid, not more than twice as long as thick.
    Prickles 8–10 mm. long, equaling or exceeding the diameter of the body . 4. *X. speciosum.*
    Prickles 3–5 (–7) mm. long, much shorter than the diameter of the body . 6. *X. echinatum.*

985. X. spinosum.

1. **X. spinòsum** L. Hoary-pubescent, armed at the axils with triple spines; stems slender; *leaves lanceolate* or ovate-lanceolate, short-petiolate, *white-downy beneath*, often 2–3-lobed or -cut; fruit about 1 cm. long, with a single short beak or beakless. — Waste places, Me. to Ont., westw. and southw. (Nat. from Trop. Am.) Fig. 985.



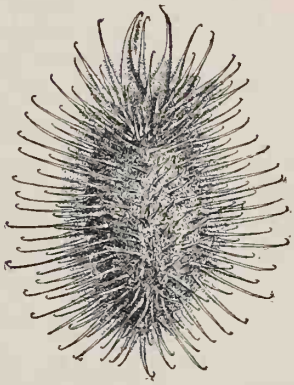
986. X. canadense.

2. **X. canadénse** Mill. Leaves broadly ovate, cordate, usually 3-lobed and simply or doubly dentate; *burs glabrous or merely granular- or glandular-puberulent; the body fusiform-ellipsoid*, 14–17 mm. long, 5–8 mm. in diameter; the *beaks* usually 2, *straight* or but slightly curved; *prickles scattered*, straight-tipped or hooked. (*X. pensylvanicum* Wallr.?; *X. pungens* Wallr.; *X. glabratum* Britton.) — Rich soil, especially in moist places. Fig. 986.

987. X. commune.

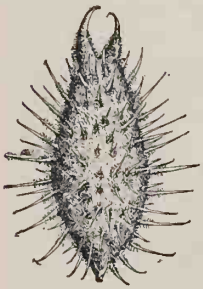
3. **X. commùne** Britton. Similar in habit and foliage; beaks of the bur more or less strongly incurved, usually hooked at the summit; *prickles numerous, crowded*, 3–6 *mm. long*, hooked at the summit, *hairy as is the body*. — Similar situations. Fig. 987.

4. **X. speciòsum** Kearney. Of the same habit, foliage, etc.; *bur with numerous long* (8–10 mm.) *filiform* usually stramineous and very *hairy prickles;* beaks moderately incurved and hooked. — Waste places and low moist ground, Tenn. to N. Dak. and Tex.; also sparingly adventive on wool-waste, etc., eastw. Fig. 988.



988. X. speciosum.

5. **X. infléxum** Mackenzie & Bush. Habit, foliage, etc., as in the three preceding species; *bur large*, the body 2 cm. long, 6–7 mm. thick, *ovoid-fusiform, merely granular-puberulent; beaks* 2, *very strongly incurved*, often *forming a loop* or arch over the fruit; prickles numerous but less crowded than in the preceding, firm in texture, brownish, arcuate, hooked at the summit, granular-puberulent, at least toward the base. — Bottom lands, Courtney, Mo. (*Bush*).



989. X. echinatum.

6. **X. echinàtum** Murr. Of the same habit, etc.; *burs plumper; the body thickish-ovoid*, 15–22 mm. long, 8–12 mm. thick, for the most part densely pubescent as are also the numerous short rigid hooked prickles and stout falcate-incurved beaks. (*X. canadense*, var. Gray.) — Sea-beaches, lake-shores, etc., Me. to N. C., and westw. chiefly along the Great Lakes to N. Dak. and Sask. Fig. 989.

43. HELIÓPSIS Pers. Ox-eye

Heads many-flowered; rays 10 or more, fertile. Involucral bracts in 2 or 3 rows, nearly equal; the outer leaf-like and somewhat spreading, the inner shorter than the disk. Receptacle conical; chaff linear. Achenes smooth, thick, 4-

angular, truncate; pappus none, or a mere border. — Perennial herbs, resembling *Helianthus*. Heads showy, peduncled, terminal. Leaves opposite, petioled, triple-ribbed, serrate. Flowers yellow. (Name from ἥλιος, *sun*, and ὄψις, *appearance*, from the likeness to the Sunflower.)

1. **H. helianthoides** (L.) Sweet. *Nearly smooth*, 0.3–1.5 m. high; leaves ovate-lanceolate or oblong-ovate, rather narrowly pointed, occasionally ternate; bracts (as in the next) with a rigid strongly nerved base; rays linear; *pappus none or of 2–4 obscure teeth.* (*H. laevis* Pers.) — Banks and copses, Ont. to Ill., and southw. Aug.

2. **H. scàbra** Dunal. *Roughish*, especially the leaves, which are disposed to be less narrowly pointed, the upper sometimes entire; rays broadly oblong to linear or oblanceolate; *pappus coroniform and chaffy or of 2 or 3 conspicuous teeth.* — Me. to Man., s. to N. J. and Ark.; rare eastw.

44. ECLÍPTA L.

Heads many-flowered; ray short; disk-flowers perfect, 4-toothed, all fertile. Involucral bracts 10–12, in 2 rows, leaf-like, ovate-lanceolate. Receptacle flat, with almost bristle-form chaff. Achenes short, 3–4-sided, or in the disk laterally flattened, roughened on the sides, hairy at summit; pappus none or an obscure denticulate crown. — Annual rough herb, with slender stems and opposite leaves. Heads solitary, small. Flowers white; anthers brown. (Name from ἐκλείπειν, *to be deficient*, alluding to the absence of pappus.)

1. **E. álba** (L.) Hassk. Rough with fine appressed hairs; stems procumbent or ascending, 2–9 dm. high; leaves lanceolate or oblong, acute at each end, mostly sessile, slightly serrate; rays equaling the disk. — Wet river-banks and waste places, Mass., westw. and southw.; in the Northeast an introduced plant. (Trop.)

45. TETRAGONOTHÈCA [Dill.] L.

Heads many-flowered, radiate; the rays 6–9, fertile. Involucre double, the outer of 4 large and leafy ovate bracts, united below by their margins into a 4-angled or winged cup; the inner of small chaffy bracts, as many as the ray-flowers and partly clasping their achenes. Receptacle convex or conical, with narrow and membranaceous chaff. Achenes very thick, obovoid, flat at the top; pappus none. — Erect perennials, with opposite coarsely toothed sessile sometimes connate leaves, and large single heads of pale yellow flowers, on terminal peduncles. (Name from τετράγωνος, *four-angled*, and θήκη, *a case*, from the shape of the involucre.)

1. **T. helianthoides** L. Villous and somewhat viscid, 3–7 dm. high, simple; leaves ovate or rhombic-oblong, sessile by a narrow base; involucral bracts and rays 2–3 cm. long. — Sandy soil, Va., and southw. June.

46. RUDBÉCKIA L. Cone-flower

Heads many-flowered, radiate; the rays neutral. Bracts of the involucre leaf-like, in about 2 rows, spreading. Receptacle conical or columnar; the short chaff concave, not rigid. Achenes 4-angled (in our species), smooth, not margined, flat at the top, with no pappus, or a minute crown-like border. — Chiefly perennial herbs, with alternate leaves, and showy terminal heads; the rays generally long, yellow, often darker at base. (Named in honor of the *Professors Rudbeck*, father and son, predecessors of Linnaeus at Upsal.)

* *Achenes angulate; chaff persisting in age.*

— *Disk hemispherical to ellipsoid-ovoid in fruit, dark purple or brown.*

— *Lower leaves 3-lobed or parted.*

1. **R. trílobа** L. *Hairy*, biennial, much branched, 0.5–1.5 m. high; branches

slender and spreading; upper leaves ovate-lanceolate, sparingly toothed; lower 3-lobed, tapering at base, coarsely serrate (those from the base pinnately parted or undivided); rays 8–10, oval or oblong; chaff of the *black-purple depressed-globular disk* smooth, awned. — Rich soil, N. J. to Minn., Kan., and southw.; escaped from cultivation further northeastw. July, Aug. — Heads small, but numerous and showy.

2. R. subtomentòsa Pursh. Stem branching above, 0.5–1.5 m. high, *downy*, as well as the petiolate ovate or ovate-lanceolate serrate leaves beneath; heads short-peduncled; *disk globular, dull brown;* receptacle sweet-scented; blunt apex of chaff downy. — Prairies and low ground, Wisc. to Kan., and southw.

++ ++ *Leaves undivided, rarely laciniate-toothed.*

= *Pappus none; annuals or biennials.*

3. R. hírta L. (Yellow Daisy, Black-eyed Susan, Nigger-head.) *Biennial*, very rough and bristly-hairy throughout; stems simple or branched near the base, stout, 3–8 dm. high, naked above, bearing single large heads; *leaves nearly entire, the upper oblong or lanceolate, sessile;* the lower spatulate, triple-nerved, petioled; rays (about 14) more or less exceeding the involucre; *chaff of the dull brown disk hairy at the tip*, acutish. — Dry soil, w. N. Y. to Man., and southw.; now common as a weed in eastern fields, where introduced with seed from the West. June–Sept. — Variable as to the pubescence, and the breadth and toothing of the leaves. *R. Brittonii* and *R. monticola* Small appear to be mountain phases with somewhat broader and more dentate cauline leaves.

= = *Pappus a short crown; perennials.*

4. R. fúlgida Ait. *Hairy*, 3–9 dm. high, the branches naked at the summit and bearing single heads; *leaves spatulate-oblong* or lanceolate, *partly clasping, triple-nerved, the upper entire, mostly obtuse;* rays about 12, orange-yellow, equaling or exceeding the ample involucre; *chaff of the dark purple disk nearly smooth* and blunt. — Dry soil, N. J. and Pa. to Ky., Mo., and southw. — *R. palustris* Eggert, with ovate-lanceolate leaves, and *R. missouriensis* Engelm., with oblong-lanceolate obtusish somewhat more pubescent leaves and slightly more fasciculate branching, fail to maintain satisfactory specific differences.

5. R. spathulàta Michx. *Pubescence short and appressed;* slender, 3–9 dm. high; *leaves obovate or spatulate or the upper ovate to lanceolate*, sometimes all lanceolate or oblanceolate to linear, denticulate; heads long-peduncled, smaller than in the preceding, the rays fewer and broader. — Pine woods, Pa., Va., Tenn., and southw.

6. R. speciòsa Wenderoth. Roughish-hairy, 1 m. or less high, branched; the branches upright, elongated and naked above, terminated by single large heads; *basal leaves elliptic-ovate; the cauline lanceolate, pointed at both ends, petioled, 3–5-nerved, coarsely and unequally toothed or incised;* involucre much shorter than the numerous elongate rays (3 cm. long); chaff of the dark purple disk acutish, smooth. (*R. umbrosa* Boynton & Beadle?) — N. J. and Pa. to Ga. and Mo. Var. Sullivánti (Boynton & Beadle) Robinson. Stem-leaves ovate, less coarsely toothed, not incised. (*R. Sullivanti* Boynton & Beadle.) — O. to Mich. and Ark.

+ + *Disk columnar in fruit, dull greenish-yellow.*

++ *Leaves divided or cut.*

7. R. laciniàta L. Stem smooth, branching, 0.5–2 m. high; leaves smooth or roughish, the lowest pinnate, with 5–7-cut or 3-lobed leaflets; upper leaves irregularly 3–5-parted, their lobes ovate-lanceolate, pointed, or the uppermost undivided; heads long-peduncled; disk at first globular or hemispherical; chaff truncate, downy at tip; rays oblanceolate, 3–5 cm. long, drooping. — Low thickets, w. Me. and w. Que., westw. and southw. July–Sept.

Var. hùmilis Gray. Low and glabrous; some of the radical leaves undivided or with roundish divisions; heads smaller (12 mm. high) and rays shorter. — Mts. of Va. and Tenn.

** *Leaves entire.*

8. R. MÁXIMA Nutt. Very robust, 1–3 m. high; leaves large, entire or repand-denticulate, ovate-lanceolate to oblong, obtuse, smooth and glaucous, the upper cordate-clasping; columnar disk at length 4–8 cm. long; rays yellow. — Sheffield, Mo. (*Bush*), where sparingly introduced on railroad ballast; Ark., La., and Tex.

* * *Achenes subterete, not angled; chaff soon deciduous.*

9. R. amplexicaúlis Vahl. Annual, 3–6 dm. high, glabrous, glaucous, leafy; leaves 1-ribbed, entire, serrate or sinuate, upper oblong or ovate, cordate-clasping; heads showy, 3–5 cm. broad; involucral bracts small, lanceolate; rays yellow or with brown bases; disk becoming 2–3 cm. high. — Mo., southw. and southwestw.

47. BRAUNÈRIA Neck. PURPLE CONE-FLOWER

Heads many-flowered; rays mostly drooping, pistillate but sterile. Bracts of the involucre imbricated, lanceolate, spreading. Receptacle conical, the lanceolate carinate spiny-tipped chaff longer than the disk-flowers. Achenes thick, short, 4-sided; pappus a small toothed border. — Perennial herbs, with stout and nearly simple stems naked above and terminated by a single large head; leaves chiefly alternate, 3–5-nerved. Rays rather persistent; disk purplish. (Named, it is said, for *Jacob Brauner*, a German herbalist of the early part of the 18th century.) ECHINACEA Moench.

* *Rays purple, rose-color, or rarely white.*

1. B. purpùrea (DC.) Britton. Stem smooth, or in one form rough-bristly; *leaves* rough, often serrate; the lowest *ovate, 5-nerved*, veiny, long-petioled; the others *ovate-lanceolate;* involucre imbricated in 3–5 rows; rays 15–20, dull purple (rarely whitish), 2.5–4.5 cm. long or more. (*Echinacea* Moench.) — Prairies and banks, from w. Pa. and Va. to Mich., Ia., and southw.; reported as adventive eastw. July.

2. B. angustifòlia (DC.) Heller. Low, 2–4 *dm. high, hirsute; leaves lanceolate* and *linear-lanceolate, attenuate at base*, 3-nerved, *entire;* involucre less imbricated and heads often smaller; *rays* 2–2.5 *cm. long*, 2–3-toothed, *spreading*, purplish or white. (*Echinacea* DC.) — Limestone barrens and dry slopes, Tenn. to the Saskatchewan and Tex. May–Aug.

3. B. pállida (Nutt.) Britton. Taller than the preceding, 1 m. or less high; *rays slender and drooping*, 4–7 *cm. long*, 2-toothed. (*Echinacea* Nutt.) — Mich. and Ill. to Ala. and Tex.; also locally naturalized eastw. June, July.

* * *Rays bright yellow.*

4. B. paradóxa Norton. In habit similar to the two preceding, but nearly glabrous, 5–8 dm. high; the narrowly lance-linear somewhat rigid and strongly 3-veined leaves 1–2 dm. long, 0.8–3.5 cm. wide, scabrous on the margins, sparingly strigillose or quite smooth on the surfaces; rays drooping, 3–4 cm. long. (*? B. atrorubens* Britton, in part, not Nutt.) — Prairies and barrens, Mo. (*Bush*) to Tex. June.

48. LÉPACHYS Raf.

Heads many-flowered; the rays few, neutral. Involucral bracts few and small, spreading. Receptacle columnar; the chaff truncate, thickened and bearded at the tip, partly embracing the flattened and margined achenes. Pappus none or of 2 teeth. — Perennial herbs, with alternate pinnately divided leaves; the grooved stems or branches naked above, bearing single generally showy heads. Rays yellow or party-colored, drooping; disk grayish. (Name from λεπίς, *a scale*, and παχύς, *thick*, from the thickened tips of the chaff.)

1. L. pinnàta (Vent.) T. & G. Hoary with minute appressed hairs, slender, 0.5–1.5 m. high, branching; leaflets 3–7, lanceolate, acute; disk ellipsoid, much shorter than the large (5 cm. long) and drooping light-yellow rays. (*Ratibida* Barnhart.) — Dry soil, w. N. Y. to Minn., Neb., and southw.; also locally

adventive eastw. June, July. — The receptacle exhales a pleasant anisate odor when bruised.

2. **L. columnàris** (Sims) T. & G. Branching from base, 3–8 dm. high; leaflets 5–9, oblong to narrowly linear, entire or 2–3-cleft; disk columnar, often 3 cm. long or more; ray as long or shorter, yellow or (var. PULCHÉRRIMA T. & G.) in part or wholly brown-purple. (*Ratibida* D. Don.) — Minn. to Assina. and Tex.; also established near Ottawa, Ont. (according to J. M. Macoun). May, June.

49. SPILÁNTHES Jacq.

Heads small, many-flowered; rays, when present, fertile. Involucral bracts few, loose. Receptacle elongated, columnar; chaff conduplicate, enwrapping the achenes. Ray-achenes 3-angled or obcompressed; disk-achenes somewhat compressed, with acute margins continued into setiform awns, or the pappus none. — Slender spreading or depressed herbs with opposite leaves and ovoid-conical pedunculate heads. Rays yellow or white. (Name from σπῖλος, *a stain*, and ἄνθος, *flower*.)

1. **S. americàna** (Mutis) Hieronymus, var. **rèpens** (Walt.) A. H. Moore. Pubescent or glabrous, decumbent or loosely ascending; leaves elliptic-ovate to lanceolate, 2–9 cm. long, petioled, strongly but equally toothed; peduncles 3–12 cm. long; heads 9–16 mm. in length. (*S. repens* Michx.) — Low moist places, Mo. to S. C., Fla., and Tex.

50. BORRÍCHIA Adans. SEA OX-EYE

Heads many-flowered; rays fertile. Bracts of the hemispherical involucre imbricated. Receptacle flat, covered with lanceolate rigid and persistent chaff. Achenes somewhat wedge-shaped, 3–4-angled; pappus a short 4-toothed crown. — Shrubby low maritime plants, coriaceous or fleshy, with opposite nearly entire leaves, and solitary peduncled terminal heads of yellow flowers; anthers blackish. (Named for *Olof Borrich*, a Danish botanist.)

1. **B. frutéscens** (L.) DC. Whitened with a minute silky pubescence, 0.2–1 m. high; leaves obovate to spatulate-oblong or lanceolate, often toothed near the base; chaff rigidly pointed. — Salt-marshes, Va., and southw.

51. HELIÁNTHUS L. SUNFLOWER

Heads many-flowered; rays several or many, neutral. Involucre imbricated, herbaceous or foliaceous. Receptacle flat or convex; the persistent chaff embracing the 4-sided and laterally compressed smooth achenes, which are neither winged nor margined. Pappus very deciduous, of 2 thin chaffy scales on the principal angles, and sometimes 2 or more small intermediate scales. — Coarse and stout herbs, with solitary or corymbed heads, and yellow rays; flowering toward autumn. (Named from ἥλιος, *the sun*, and ἄνθος, *a flower*.)

§ 1. *Annuals; leaves mostly alternate, petiolate; receptacle flat; disk brownish.*

1. **H. ánnuus** L. (COMMON S.) Tall, rough; *leaves* triple-ribbed, *ovate or the lower cordate*, serrate; involucral bracts broadly ovate to oblong, long-pointed, ciliate; *disk usually* 2.5 cm. *broad or more.* — Rich soil, Minn. to Tex., and westw.; long cultivated, and occasionally found in waste grounds eastw.

2. **H. petiolàris** Nutt. More slender, 0.3–2 m. high; *leaves oblong- or ovate-lanceolate*, smaller (2.5–8 cm. long), mostly entire; bracts lanceolate or oblong-lanceolate, seldom ciliate; *disk about* 1.5 cm. *broad.* — Minn. to Man., Tex., and westw.; occasionally in waste places, etc., eastw.

§ 2. *Perennials; receptacle convex or at length low-conical; lower leaves usually opposite.*

* *Involucral bracts loose, becoming squarrose, narrowly lanceolate, pointed, 1–1.5 cm. long; disk usually purple or brownish; leaves linear, 1-nerved.*

3. **H. orgyàlis** DC. *Stem glabrous*, tall, very leafy; leaves mostly alternate,

linear to filiform and entire, or the lowest lanceolate and serrulate; *bracts filiform-attenuate.* — Dry plains, Mo. to Neb., southw. and westw.

4. **H. angustifòlius** L. *Stem* slender, 0.5–2 m. high, *usually scabrous;* leaves mostly opposite, long and linear, sessile, entire, with revolute margins; heads loosely corymbed, long-peduncled; *bracts acute or pointed.* — Low pine barrens, L. I. and N. J. to Ky., and southw.

* * *Involucral bracts closer, more imbricated, short, unequal and not foliaceous; leaves lanceolate to ovate, mostly opposite and 3-nerved.*

— Disk dark.

5. **H. atrórubens** L. *Rough-hairy; stem slender,* 1.5–2.5 m. high, smooth and naked and forking above; *leaves thinnish, ovate or oval to oblong-lanceolate,* or the lowest heart-shaped, 7–15 cm. long, serrate, abruptly contracted into a margined petiole; heads small, corymbed; bracts ovate, obtuse, ciliolate, appressed; rays 10–16; pappus of 2 fringed scales. — Dry soil, Va. to Mo., and southw.; said to extend northwestw. to Minn.

6. **H. scabérrimus** Ell. *Stem stout,* 0.5–2 m. high or more, simple or sparingly branched, rough; *leaves very thick and rigid, rough both sides, oblong-lanceolate,* usually pointed at both ends, nearly sessile, entire or serrate, the lowest oval; heads nearly solitary, rather large; bracts ovate or oblong, obtuse, or mostly acute, ciliate, appressed; rays 20–25; pappus of 2 large and often several small scales. (*H. rigidus* Desf.) — Dry prairies, Mich. to the Saskatchewan, westw. and southwestw.; adventive in e. Mass.

— — Disk yellow.

7. **H. laetiflòrus** Pers. Closely resembling the preceding; leaves rather thinner; heads single or corymbed; bracts rather fewer (in 2 or 3 rows), narrower and acute or mostly acuminate. — Dry open places, Pa. to Minn., and southw.; sparingly adventive in e. Mass. — Rays showy, 3–5 cm. long.

8. **H. occidentàlis** Riddell. Somewhat hairy; *stem slender, simple, naked above,* 1 m. or less high, sending out runners from the base, bearing 1–5 small heads on long peduncles; *lowest leaves oval or lanceolate-ovate,* entire or obscurely serrate, *roughish-pubescent beneath, abruptly contracted into long hairy petioles; the upper small and remote;* bracts ovate to lanceolate, acute or pointed, sometimes ciliate. — Dry barrens, O. to Minn., and southw.; somewhat established on the N. J. coast (*E. F. Williams*).

Var. **Dowelliànus** (Curtis) T. & G. More robust, leafy in the middle, merely strigillose or puberulent; leaves larger, broadly oval, 5–9 cm. wide. — Mts. of N. C. and Ga.; said to extend northw. to D.C.

9. **H. illinoénsis** Gleason. Very similar to the preceding variety, but the *petioles, lower part of stem, etc., loosely villous;* leaves lance-oblong to ovate, strictly opposite, the pairs separated by well developed internodes; the blade contracted into a winged petiole of nearly its own length. — Sandy soil, in oak woods, etc., along the Illinois R. (*Gleason*). — Recently discovered and as yet but little known; perhaps only a form of the preceding species.

* * * *Involucre looser, the bracts more acuminate or elongated or foliaceous; disk yellow (anthers dark).*

— Leaves all opposite, sessile, serrulate; pubescence rather soft.

10. **H. móllis** Lam. Stem simple, leafy to the top, 1 m. high; leaves ovate to lanceolate, with broad cordate clasping base, pointed; scales lanceolate, seldom exceeding the disk. — Dry barrens, Mass. to Ia., Kan., and southw.

— — Leaves mostly alternate and 3-nerved, soft-pubescent beneath, scabrous above; scales very long and loose, hairy; tips of chaff and corolla-lobes hirsute.

11. **H. tomentòsus** Michx. Stem hairy, stout, 1–2.5 m. high; leaves oblong, lanceolate, or the lowest ovate, tapering at both ends, obscurely serrate, large (1.5–3 dm. long), somewhat petioled; disk 2.5 cm. broad; rays 12–16, about 2.5 cm. long. — Rich woods. Va., and southw. along the mts.

+ + + *Leaves narrow, the uppermost alternate, not 3-nerved, scabrous both sides; heads rather small; bracts loose, attenuate.*

+ *Stem smooth and glaucous.*

12. **H. Kellermàni** Britton. Slender, leafy, paniculately branched above; *leaves narrowly lance-linear to linear*, attenuate to the apex and subsessile base, chiefly alternate, *green both sides*, somewhat scabrous, finely and sparingly serrate; heads numerous, 3–4.5 cm. wide; involucral bracts lance-linear, subequal, about 1 cm. long; rays golden-yellow, 1–2 cm. long. — Near Columbus, O. (*Kellerman*).

13. **H. grosseserràtus** Martens. Stem 2–3 m. high; *leaves elongated-lanceolate* or ovate-lanceolate, taper-pointed, sharply serrate or denticulate, acute or attenuate at base, *petioled*, often whiter and finely pubescent beneath; bracts lance-awl-shaped, slightly ciliate. — Dry plains, w. Me. to N. J., westw. to Ont., Dak., and Tex. — Probably runs into the next.

+ + *Stem hairy or scabrous.*

14. **H. gigantèus** L. *Stem* 0.5–3 m. high, *branched above; leaves lanceolate*, pointed, minutely serrate or nearly entire, green both sides, narrowed and ciliate at base, but *nearly sessile; bracts* long, *linear-lanceolate*, pointed, hairy or strongly ciliate. (*H. Dalyi* Britton ?) — Low thickets and swamps, w. N. E. to Ont., westw. and southw. — Heads somewhat corymbed; the pale yellow rays 15–20; roots often becoming tuber-like, especially in var. SUBTUBERÒSUS (Bourgeau) Britton which has mostly opposite leaves, and occurs from n. Mich. northwestw.

15. **H. Maximiliàni** Schrad. Resembling the preceding; stout, *often simple*, 0.5–3 m. high; *leaves becoming rigid and very scabrous*, entire or sparingly denticulate; heads rather large, usually short-peduncled, terminal and in the upper axils; *bracts longer-attenuate, more rigid.* — Prairies, Minn. and the Saskatchewan to Tex.; occasionally adventive eastw.

+ + + + *Leaves all or most of them opposite, 3-nerved (faintly in* no. 17).

+ *Heads very small (about 8 mm. broad); rays 5–8; bracts few, short, irregularly imbricated, the outer with spreading foliaceous pointed tips; stems smooth.*

16. **H. microcéphalus** T. & G. Stem 1–2 m. high, with numerous slender branches above; *leaves thin, ovate-lanceolate, taper-pointed*, somewhat serrate, petioled, *rough above*, pale and puberulent beneath; peduncles slender, rough; bracts ovate and ovate-lanceolate, ciliate. (*H. parviflorus* Bernh., not H B K.) — Thickets, etc., Pa. and "s. Mich." to Mo., and southw.

17. **H. laevigàtus** T. & G. Stem slender, 0.5–2 m. high, simple or sparingly branched, glaucous, *glabrous throughout*, as well as the slightly serrate *lanceolate leaves* which are usually narrow and attenuate to the base. — Dry soil, Allegheny Mts., Va., and southw.

+ + *Heads larger; rays usually over* 10; *spreading by creeping rootstocks.*

= *Leaves sessile or subsessile to short-petiolate, serrulate or entire.*

18. **H. doronicoìdes** Lam. Finely pubescent and roughish, 1–3 m. high; *leaves sessile*, ovate-oblong, acute, *triply-nerved above the broadly cuneate base, serrulate;* bracts loose, attenuate, mostly 1–1.5 cm. long, hairy. — Dry ground, O. to Mo.

19. **H. divaricàtus** L. Stem simple or forked and corymbed at the top, 0.5–2 m. high, *smooth below; leaves all opposite and divaricate, ovate-lanceolate, 3-nerved from the rounded or truncate sessile base*, tapering gradually to a sharp point, 0.5–2 dm. long, serrate, *thickish, rough both sides;* bracts narrowly lanceolate, attenuate, ciliate, equaling the disk (1 cm. wide); rays 8–12, 2.5 cm. long. — Thickets and barrens, s. Me. to L. Winnipeg, Neb., and southw.

20. **H. hirsùtus** Raf. *Stem* simple or forked above, stout, 0.5–1 m. high, *bristly-hairy; leaves all short-petioled, ovate-lanceolate*, gradually pointed, *slightly serrate*, rounded or obtuse at the base, *very rough* above, usually rough-

hairy beneath; bracts ovate-lanceolate, pointed, equaling the disk; rays about 12. — Dry soil, Pa. to Wisc., "Minn.," southw. and southwestw.

21. **H. strumòsus** L. Stem 1–2 m. high, very smooth below, often glaucous; *leaves ovate-lanceolate, tapering gradually to a point,* or the lower ovate and acute, abruptly contracted into short margined petioles, rough above, *whitish and naked or minutely downy underneath; bracts* broadly lanceolate, *with spreading tips,* ciliate, *equaling the disk;* rays 9–15. — River-banks and low copses, N. E. to Ont., Minn., and southw. Var. MÓLLIS T. & G. Leaves downy underneath, often subcordate; bracts looser and more attenuate. (Var. *macrophyllus* Britton.) — N. E. and Pa. to Ont. and Ia.

22. **H. tracheliifòlius** Mill. Similar to the preceding; *leaves thinner and nearly equally green both sides,* more sharply serrate, all distinctly petioled; *bracts all loose and spreading, exceeding the disk,* often much elongated. — Copses, Ct. to Minn., southw. and southwestw.

= = *Leaves longer-petiolate, thinnish or soft, coarsely serrate, commonly broad; bracts loose, hirsute-ciliate.*

23. **H. decapétalus** L. Stem branching, 0.5–1.5 m. high, *smooth below;* leaves smooth or roughish, ovate, pointed, abruptly contracted into margined petioles; *bracts lanceolate-linear,* elongated, loosely spreading, sometimes foliaceous, *the outer longer than the disk; rays about* 10. (*H. scrophulariifolius* Britton ?) — Copses and low banks of streams, centr. Me. and w. Que. to Minn., Mo., and southw.

24. **H. tuberòsus** L. (JERUSALEM ARTICHOKE.) *Pubescent or hirsute,* 1.5–3.5 m. high; leaves ovate or subcordate to oblong-lanceolate, acuminate, scabrous above, minutely pubescent or cinereous beneath; *bracts lanceolate,* attenuate, *little exceeding the disk; rays* 12–20. — N. Y. to Minn., westw. and southw.; often cultivated, and introduced eastw. Var. SUBCANÉSCENS Gray. Usually dwarf, the lower side of the leaves whitish with soft fine pubescence. — Minn. to Mo., and westw.

52. ACTINÓMERIS Nutt.

Heads many-flowered; rays neutral, few or none. Involucral bracts few, herbaceous, nearly equal, soon deflexed beneath the globular disk. Receptacle small, chaffy. Achenes flat, obovate, winged or wingless, at maturity spreading in all directions; pappus of 2–3 smooth persistent awns. — Tall branching perennials, with serrate feather-veined leaves tapering to the base and mostly decurrent on the stem. Heads corymbed; flowers chiefly yellow. (Name from ἀκτίς, *a ray,* and μερίς, *a part;* alluding to the irregularity of the rays.)

1. **A. alternifòlia** (L.) DC. Stem somewhat hairy, usually winged above, 1–2 m. high; leaves alternate or the lower opposite, oblong or ovate-lanceolate, pointed at both ends; rays 2–8, irregular. (*A. squarrosa* Nutt.; *Verbesina alternifolia* Britton.) — Rich soil, N. J. to Ont., Ia., Kan., and southw. Aug., Sept.

53. VERBESÌNA L. CROWNBEARD

Heads several–many-flowered; rays pistillate, or sometimes neutral and sterile, few or sometimes none. Involucral bracts imbricated in 2 or more rows. Receptacle rather convex (conical in no. 3), the chaff concave. Achenes flat (laterally compressed), winged or wingless, 2-awned. — Mostly perennial herbs; the toothed leaves decurrent on the stem. Flowers mostly yellow. ("Name metamorphosed from *Verbena.*")

* *Heads slender, small, cymosely paniculate; rays few, pistillate, usually fertile; involucre erect.*

1. **V. occidentàlis** (L.) Walt. Stem tall, 4-winged; *leaves opposite,* ovate to oblong-lanceolate, triple-nerved, serrate, pointed at both ends, often pubescent beneath, large and thin; heads in compound corymbs; receptacle flattish; *flowers yellow;* rays 1–5, lanceolate; achenes wingless. — Rich soil, Pa. to Ky., and southw. Aug.–Oct.

2. **V. virgínica** L. *Stem* narrowly or interruptedly winged, *downy-pubescent, like the lower surface of the* ovate-lanceolate feather-veined *alternate leaves;* heads in compound corymbs; receptacle convex; *flowers white;* rays 3–4, oval; achenes winged. — Dry soil, Pa. to Kan., and southw. Aug.

* * *Heads broader, solitary or few.*

3. **V. helianthoìdes** Michx. *Perennial;* stem hairy, 1 m. or less high, widely winged by the decurrence of the ovate to ovate-lanceolate *sessile* alternate *leaves,* which are rough above and soft-hairy beneath; involucre appressed; rays 8–15, pistillate or neutral, usually sterile; achenes winged, tipped with 2 fragile awns. — Prairies and copses, O. to Ia., southw. and southwestw. June, July.

4. **V.** ENCELIOÌDES (Cav.) B. & H., var. EXAURICULÀTA Robinson & Greenman. *Annual,* branching, 3–6 dm. high, cinereous; leaves alternate, ovate or cordate to deltoid-lanceolate, the *petioles destitute of the wings* or auricles (characteristic of the typical more southern form); involucral bracts linear, equal, foliaceous, spreading; rays numerous, fertile. — Kan. to Tex., and westw.; adventive by roads, w. Mo.; also casual northeastw., *e.g.* in s. Me. (*Parlin*).

54. COREÓPSIS L. Tickseed

Heads many-flowered, radiate; rays mostly 8, neutral, rarely wanting. Involucre double; each series of about 8 bracts, the outer foliaceous and somewhat spreading; the inner broader and appressed, nearly membranaceous. Receptacle flat, with membranaceous chaff deciduous with the fruit. Achenes flat, obcompressed (*i.e.* flattened parallel with the bracts of the involucre), often winged, not narrowed at the top, 2-toothed or 2-awned, or sometimes naked at the summit; the awns not barbed downwardly. — Herbs, generally with opposite leaves and yellow or party-colored (rarely purple) rays. Too near the last section of *Bidens,* but generally well distinguished as a genus. (Name from κόρις, *a bug,* and ὄψις, *appearance*; from the form of the achene.)

§ 1. *Style-tips truncate or nearly so; outer involucre small and short; rays rose-color or yellow, with brown base; pappus an obscure border or none.*

1. **C. ròsea** Nutt. *Perennial;* stem branching, leafy, smooth, 2–6 dm. high; leaves linear, entire; heads small, somewhat corymbed, on short peduncles; *rays rose-color,* 3-toothed; achenes oblong, wingless. — Sandy grassy swamps and shores, e. Mass. to N. J., and southw. July–Sept.

2. **C. tinctòria** Nutt. *Annual,* glabrous, often 1 m. high; leaves 1–2-pinnately divided, the lobes lanceolate to linear; achenes oblong, wingless; *rays yellow,* with more or less of crimson-brown. — Minn. to Tex., etc.; common in cultivation; often escaping to roadsides, etc., eastw.

§ 2. *Style-tips abruptly cuspidate, hispid; involucres nearly equal; achenes roundish, winged, incurved, often papillose and with a callus inside at base and apex; pappus 2 small teeth or none; rays mostly yellow and palmately lobed; perennials, with long-pedunculate heads; lower leaves petiolate.*

* *Wings of achene broad, thin, spreading.*

3. **C. lanceolàta** L. Smooth or hairy, 3–6 dm. high, tufted, branched only at the base; *leaves all entire* (the lower rarely with a pair of small lateral lobes), *lanceolate,* the lowest oblanceolate or spatulate; outer bracts ovate-lanceolate. — Rich or damp soil, Ont. and Mich. to Va., Mo., and southw.; also cultivated on account of its showy heads, and sometimes escaping eastw. May–July.

Var. **villòsa** Michx. Hirsute below, the hirsute or villous leaves rather broader. (*C. crassifolia* Ait.) — Ill. and Mo. to Fla.

4. **C. grandifòra** Hogg. Mostly glabrous; lower leaves lanceolate and spatulate, entire, the *upper 3–5-parted, with lanceolate to linear and sometimes 2–3-parted lobes;* heads as in the preceding or larger. — Damp soil, Mo. and e. Kan. to Tex. and Ga. May–July.

5. **C. pubéscens** Ell. More leafy, 0.5–1.3 m. high, pubescent or nearly glabrous; *leaves thickish, oblong or the lower oval-obovate* and the upper oblong-lanceolate, entire or with 2–4 small lateral lobes; heads usually smaller. — Woods, Va. to s. Ill., Mo., and southw. June–Sept.

* * *Wings of achene narrow, callous-thickened, involute.*

6. **C. auriculàta** L. Pubescent or glabrous; stems 5–13 dm. high, branching, sometimes with runners; *leaves* mostly petioled, *the upper oblong or oval-lanceolate*, entire; *the lower oval or roundish*, some of them variously 3–5-lobed or -divided; outer bracts oblong-linear or lanceolate. — Rich woods and banks, Va. to Ill., and southw. June–Sept.

§ 3. *Style-tips cuspidate; achenes oblong, nearly straight, without callus, the wing narrow or none; rays yellow, mostly entire or slightly toothed.*

* *Outer bracts narrow, about the length of the inner, all more or less united at base; rays mostly entire, acute; pappus 2-toothed or none; leaves opposite, sessile, mostly 3-divided, appearing as if whorled; perennial, 3–9 dm. high.*

← *Leaves 3-cleft, but not to the base.*

7. **C. palmàta** Nutt. Nearly smooth, simple; leaves broadly wedge-shaped, rigid; the lobes broadly linear, entire, or the middle one 3-lobed. — Prairies, Mich. to Man., and southwestw. July.

← ← *Leaves divided to the base, uppermost and lowest sometimes simple.*

8. **C. màjor** Walt. Plant minutely soft-pubescent; leaves each divided into 3 sessile *ovate-lanceolate entire leaflets*, therefore appearing like 6 in a whorl. (*C. senifolia* Michx.) — Sandy woods, Va., and southw. July.

Var. **stellàta** (Nutt.) Robinson. Glabrous; the leaves narrower. (*C. senifolia*, var. T. & G.; *C. major*, var. *Oemleri* Britton.) — Va., Ky., and southw.

9. **C. delphinifòlia** Lam. Glabrous or nearly so; leaves divided into 3 sessile *leaflets* which are 2–5-*parted, their divisions lance-linear*, 2–6 mm. broad, rather rigid; disk brownish. — Pine woods, Va., and southw. July.

10. **C. verticillàta** L. Glabrous; leaves divided into 3 sessile *leaflets* which are 1–2-*pinnately parted into narrowly linear or filiform divisions.* — Dry ridges and open woods, Md. to S. C. and Ark.; reported from w. Ont. and n. Mich.; cultivated in old gardens, but not showy; occasionally escaping. July–Sept.

* * *Outer bracts narrow, shorter, all united at base; rays entire, obtuse; pappus none; leaves petiolate, pinnately 3–5-divided; perennial.*

11. **C. trípteris** L. (Tall Coreopsis.) Smooth; stem simple, 1–2.7 m. high, corymbed at the top; leaflets lanceolate, acute, entire. — Pa. to s. Ont., Wisc., e. Kan., and southw. Aug., Sept. — Heads exhaling the odor of anise when bruised; disk turning brownish.

55. THELESPÉRMA Less.

Heads many-flowered; rays about 8 and neutral, or none. Involucre as in *Coreopsis*, the inner bracts scarious-margined. Receptacle flat, the scarious chaff falling with the wingless and beakless achenes; pappus of 2 stout subulate retrorsely hispid awns. — Smooth herbs, with opposite dissected leaves and pedunculate heads of yellow flowers. (From θηλή, *a nipple*, and σπέρμα, *seed*, on account of the papillose achenes.)

1. **T. trífidum** (Poir.) Britton. *Annual or biennial*, 3–7 dm. high, loosely branching and very leafy; leaves 2-pinnate, the lobes filiform; *outer involucral bracts* 8, *subulate-linear*, hardly equaling the *inner* which are *united only below the middle*; rays 1 cm. or more long; outer achenes conspicuously roughened on the back. — Barrens and plains, Mo. to Neb., westw. and southwestw. May–Aug.

2. **T. grácile** (Torr.) Gray. *Perennial*, rather rigid, naked above; leaves with narrow or filiform divisions or the upper entire; *bracts* 4–6, *the outer very*

short-ovate or oblong, the inner connate above the middle; rays short or usually none; achenes less roughened. — Neb. and Kan., southw. and westw.; adv. in Mo.

56. BÌDENS L. Bur Marigold

Heads many-flowered; the rays when present 3–8, neutral. Involucre double, the outer commonly large and foliaceous. Receptacle flattish; chaff deciduous with the fruit. Achenes flattened parallel to the bracts of the involucre, or slender and 4-sided (rarely terete), crowned with awns or short teeth (these rarely naked). — Annual or perennial herbs, with opposite various leaves, and mostly yellow flowers. (Latin, *bidens*, two-toothed.)

N. B. — In this genus the measurements of the fruit relate to the inner mature achenes. The outer are often shorter and uncharacteristic. The figures of the heads are on a scale of $\frac{2}{3}$, those of the achenes are life size.

a. Achenes flat (or at most with a strong rib on either face) *b.*
  b. Rays small or wanting *c.*
    c. Inner achenes less than 2 mm. broad.
      Heads cylindric or ellipsoid, much longer than broad; disk-florets 3–4 mm. long; leaves simple.
        Inner achenes 1 cm. or more long; awns 6–8 mm. long . . 1. *B. bidentoides.*
        Inner achenes 7–9 mm. long; awns 3–4.5 mm. long . . . 2. *B. Eatoni.*
      Heads hemispherical, nearly or quite as broad as long; disk-florets 1–1.5 mm. long; achenes 5.5–8.5 mm. long; awns 1.5–2.5 mm. long; leaves ternately compound . . . . . 3. *B. discoidea.*
    c. Inner achenes 2 mm. or more broad *d.*
      d. Leaves simple; heads subtended by long thick entire leafy bracts; achenes 8–10 mm. long, 2–3 mm. broad, retrorsely barbed, the 3 (rarely 2 or 4) awns unequal, at most 6 mm. long . . 6. *B. comosa.*
      d. Leaves pinnate; achenes upwardly barbed at least at base; awns 2.
        Outer involucre of 5–8 leafy bracts; inner bracts oblong, equaling the disk; achenes 2–3.3 mm. broad . . . 4. *B. frondosa.*
        Outer involucre of 10–16 leafy bracts; inner bracts ovate-triangular, shorter than the disk; achenes 3.3–4 mm. broad . 5. *B. vulgata.*
  b. Rays conspicuously exceeding the disk *e.*
    e. Leaves mostly pinnate; awns (if present) upwardly barbed *f.*
      f. Inner achenes 2 mm. or less broad, cuneate.
        Inner achenes 3–4.5 mm. long . . . . . 11. *B. coronata.*
        Inner achenes 5–7 mm. long . . . . . 12. *B. trichosperma.*
      f. Inner achenes more than 2 mm. broad, elliptic-obovate, with thin scarious margins.
        Outer foliaceous bracts 8–10, smooth or merely ciliate, shorter than the inner . . . . . 13. *B. aristosa.*
        Outer foliaceous bracts 12–20, coarsely hispid, mostly longer than the inner . . . . . 14. *B. involucrata.*
    e. Leaves simple or slightly divided; achenes obovate, 3–4.5 mm. long, with short teeth . . . . . 11. *B. coronata.*
a. Achenes angled or terete *g.*
  g. Achenes distinctly angled; terrestrial or marsh plants *h.*
    h. Leaves pinnate.
      Heads few-flowered, slender; achenes linear, 4-angled, the inner 1.2–1.8 cm. long, about 1 mm. broad . . . . . 10. *B. bipinnata.*
      Heads hemispherical, many-flowered; achenes cuneate, 3–4 angled, 4–6 mm. long . . . . . (7) *B. connata*, v. *pinnata.*
    h. Leaves simple; heads hemispherical, many-flowered; achenes cuneate or obovate.
      Leaves petioled or with conspicuously narrowed bases; fruiting heads erect . . . . . 7. *B. connata.*
      Leaves sessile or connate; fruiting heads mostly nodding.
        Outer bracts unequal, mostly exceeding the disk; rays at most twice the length of the disk; achenes dilated above; leaves mostly connate . . . . . 8. *B. cernua.*
        Outer bracts subequal, rarely exceeding the disk; rays 2–4 times as long as the disk; achenes not dilated above; leaves sessile, but rarely connate . . . . . 9. *B. laevis.*
  g. Achenes terete, truncate at both ends, with the 3–6 very long awns smooth below; aquatic, with the immersed leaves finely divided . 15. *B. Beckii.*

1. **B. bidentoides** (Nutt.) Britton. Glabrous, paniculately branched, 2–8 dm. high; leaves lanceolate, coarsely toothed, tapering at both ends; heads 1.5–2 cm. long; the outer involucre of 4–5 bracts; rays usually wanting; *achenes*

990. B. bidentoides.

hairy, 1 *cm. or more long, with 2 very slender upwardly roughened awns* (6–8 *mm. long*) surpassing the *yellowish 4-toothed corolla*, and often 2 minute intermediate teeth. (*Coreopsis* Nutt.) — Shores of Delaware R. and Bay. Sept., Oct. Fig. 990.

991. B. Eatoni.

2. **B. Eatòni** Fernald. Simple or branched, 2.5–6 dm. high; leaves lanceolate, with long-acuminate tips and slender petiolar bases, coarsely serrate; outer involucre of 3–5 bracts, inner of 5 oblong conspicuously striate ones 1 cm. long; rays none; disk-flowers 15–25; *inner achenes* 7–9 *mm. long*, 1–1.7 mm. broad, with strong midribs, usually with retrorse hairs on the margin; the 2–4 *awns* 3–4.5 *mm. long*, downwardly barbed. — Brackish shores, lower Merrimac R., Mass. Sept., Oct. Fig. 991. Var. FÁLLAX Fernald. Achenes and awns upwardly barbed. — With the typical form. Fig. 992.

992. B. Eat., v. fal.

3. **B. discoídea** (T. & G.) Britton. Diffusely branched; *leaves ternately divided*, slender-petioled; leaflets ovate-lanceolate, pointed, coarsely serrate; *heads* small, 5 *mm. high;* outer involucral bracts usually 4; *achenes linear-wedge-shaped*, tuberculate or smooth, bearing a pair of *short and stout upwardly barbed awns of the length of the* orange 5-toothed *corolla*. (*Coreopsis* T. & G.) — Wet banks and swamps, Mass. to Mich., Ill., southw. and southwestw. July–Oct. Fig. 993.

993. B. discoidea.

994. B. frondosa.

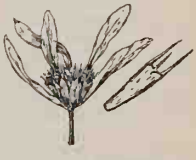
4. **B. frondòsa** L. (Beggar-ticks.) Stems tall (7 dm. or less in height), paniculate-branched; leaves 3–5-divided, glabrous, the terminal leaflet long-stalked, acuminate, often again divided, lateral ones shorter, less acuminate, all sharply serrate; *heads* 1.5 *cm. long or less, on slender peduncles; outer involucre of* 5–8 *ciliate bracts;* rays small, yellow; *achenes narrowly cuneate*, 7–10 *mm. long, black*, strongly 1-nerved on each face, often slightly hairy, the retrorsely barbed slightly divergent slender awns barely half as long, exceeding the 5-toothed *orange corolla*. (*B. melanocarpa* Wiegand.) — Common in damp ground, throughout. Aug., Sept. Fig. 994. Var. ANÓMALA Porter. Awns upwardly barbed. — Local, N. S. to Pa. Fig. 995.

995. B. fron., v. anom.

5. **B. vulgàta** Greene. (Beggar-ticks, Stick-tight.) Stem tall (often 1.5 m. high) and branching, glabrous; leaves pinnately 3–5-divided, slender-petioled, nearly glabrous; leaflets lanceolate, very acute, coarsely serrate, all short-stalked; *heads large*, 1.5–2.5 *cm. broad, stout-pedunculate; outer involucral bracts* 10–16, *unequal*, about equaling the disk or sometimes longer, *coarsely ciliate-hispid;* rays pale yellow; *achenes* 9–12 *mm. long, obovate- or oblong-cuneate*, usually glabrous, but often tuberculate-roughened, *brown or olive;* awns retrorsely barbed, exceeding the 4–5-toothed *yellow corolla*. (*B. frondosa* Wiegand, not L.) — Moist waste places and roadsides, throughout, but less common eastw. than the preceding. Aug.–Oct. Fig. 996.

996. B. vulgata.

Var. **pubérula** (Wiegand) Greene. Peduncles, leaves, and outer bracts puberulent. — Wisc. to Sask. and Mo.


997. B. comosa.

6. **B. comòsa** (Gray) Wiegand. Stem stout, 8 dm. or less in height, glabrous; branches short; *leaves pale*, elliptic, acute, *with winged petioles*, regularly serrate, or upper entire: heads few, large, 1 cm. or so high, short-pedunculate; *outer involucre of* 6–8 *nearly erect linear or lanceolate* usually entire unequal *large bracts, the longest* 2–5 *times exceeding the disk;* rays wanting: *achenes about* 1 *cm. long*, cuneate,

olive or brown, nearly glabrous, obscurely nerved or nerveless, sometimes punctate; *awns nearly ¾ as long as the achene*, equaling the *4-toothed* pale-yellow *corolla*. (*B. connata*, var. Gray.) — Sandy shores and rich soil, N. E. to Minn., westw. and southw. Sept., Oct. Fig. 997.

Var. **acùta** Wiegand. Leaves subsessile; heads larger; outer bracts shorter (barely twice exceeding the disk), spreading, acute. (*B. acuta* Britton.) — Mo. and Kan.

7. **B. connàta** Muhl. (Swamp Beggar-ticks.) Tall and branching, 0.5–1.5 m. high; *leaves bright green*, undivided or some of the lower deeply parted, lanceolate or elliptic, large, acuminate, *slender-petioled*, coarsely serrate; heads about 1 cm. high, short-pedunculate; *outer involucre of 4 or 5 short entire bracts;* rays golden-yellow, generally wanting; *achenes 4–6 mm. long*, cuneate, the outer 3-angled and 3-awned, inner 4-angled, 4-awned; *awns barely half as long as the achene*, retrorsely barbed, equaling the *5-toothed corolla.* — Swamps and ditches, N. E. to Minn. and Mo. Sept. (Established in Eu.) Fig. 998.

998. B. connata.

Var. **pinnàta** Wats. Achenes nearly all pinnately divided, the 5–7 divisions sparingly incised; achenes 4-awned. — Hennepin Co., Minn. (*F. L. Couillard*).

8. **B. cérnua** L. (Stick-tight.) Smooth or hispidulous, 2–7 dm. high; branches short; *leaves* lanceolate to linear-lanceolate, acuminate, *unequally serrate, connate at base;* heads erect in anthesis, short-pedunculate; *outer involucre longer than the head;* rays, when present, one half exceeding the disk or longer; *achenes* wedge-obovate, *5–6 mm. long*, 4-awned, 4-angled, retrorsely barbed, *tuberculate on the angles*, and prominently many-nerved; awns half as long as the achene, shorter than the yellow 5-toothed corolla. — Wet places, throughout. July–Oct. (Eu.) Fig. 999. — Very variable.

999. B. cernua.

9. **B. laèvis** (L.) BSP. Smooth, erect, or reclining at base, 1 m. or less high; *leaves lanceolate, tapering at both ends*, sessile, *rarely connate finely and regularly serrate; outer involucre mostly shorter than the showy golden-yellow* (*2–3 cm. long*) *rays; achenes 6–9 mm. long*, wedge-shaped, retrorsely *almost serrate on the margins;* awns 2, 3, or 4, downwardly barbed, barely ⅔ as long as the achene, and hardly equaling the yellow 5-toothed disk-corolla. (*B. chrysanthemoides* Michx.) — Swamps near the coast, Mass., and southw.; also centr. N. Y. Aug.–Oct.

10. **B. bipinnàta** L. (Spanish Needles.) Smooth annual, branched; *leaves 1–3-pinnately parted*, petioled; leaflets ovate-lanceolate, mostly wedge-shaped at the base; heads small, on slender peduncles; *outer involucre of linear bracts equaling the short pale yellow rays; achenes 4-grooved*, nearly smooth, 3–4-awned, *very unequal.* — Damp soil, R. I., westw. and southw.; occasional on ballast northw. Fig. 1000.

1000. B. bipin.

11. **B. coronàta** (L.) Fisch. Nearly glabrous, 3–9 dm. high; leaves variable, commonly 3–7-divided, or all undivided, the segments incisely serrate or lobed; rays golden-yellow, showy; *achenes* flat, 1-nerved on each face, *broadly cuneate*, 3–4.5 *mm. long*, with 2 *very short blunt spreading teeth.* (*Coreopsis aurea* Ait.) — Wet ground, Va. to Fla. Fig. 1001.

1001. B. coronata.

12. **B. trichospérma** (Michx.) Britton. (Tickseed Sunflower.) Smooth, branched; leaves short-petioled, nearly all 3–7-divided; leaflets lanceolate or lance-linear, cut-toothed, or the upper leaves only 3–5-cleft and almost sessile; heads panicled-corymbose; rays conspicuous, golden-yellow; *achenes narrowly wedge-oblong or the inner ones wedge-linear*, 5–7 *mm. long*, smooth or sparsely hairy, marginless, *crowned with 2 erect triangular or awl-shaped stout teeth.* (*Coreopsis* Michx.) — Swamps, Mass. to Va. near the coast; also N. Y. to Ill. and Ky.; said to extend northwestw. to Minn. Aug.–Oct. Fig. 1002.

1002. B. trich.

Var. TENUÍLOBA (Gray) Britton. Leaf-segments narrowly linear; achenes shorter. — Less common.

13. B. aristòsa (Michx.) Britton. Somewhat pubescent; leaves 1–2-pinnately 5–7-divided, petioled; leaflets lanceolate, cut-toothed or pinnatifid; heads panicled-corymbose; *outer bracts* 8–10, *not exceeding the inner, barely ciliate;* rays showy; *achenes with* 2 (rarely 4) *long and slender diverging awns* as long as the achene itself or reduced to short teeth. (*Coreopsis* Michx.) — Swamps, O. to Mich., Minn., and southwestw.; adventive in waste places eastw. Aug.–Oct. FIG. 1003.

1003. B. aristosa.

14. B. involucràta (Nutt.) Britton. Heads rather larger; *the outer bracts* 12–20, *mostly exceeding the inner, slender and hispid; achenes with* 2 *short acute teeth.* (*Coreopsis* Nutt.) — Swamps, w. Ill. to Kan. and Tex.; rarely adventive eastw. FIG. 1004.

15. B. Béckii Torr. (WATER MARIGOLD.) *Aquatic*, perennial, smooth; stems long and slender; *immersed leaves crowded, many times dissected into capillary segments;* the few emerging leaves lanceolate, slightly connate, toothed; heads single, short-peduncled; involucre much shorter than the showy (golden yellow) rays; *achenes thickish, smooth*, 1–1.5 *cm. long; the stout divergent awns longer, barbed only toward the apex.* — Ponds and slow deer streams, Me. and Que. to N. J., and westw. Aug.–Oct.

1004. B. involucrata.

57. BALDUÌNA Nutt.

Heads globular, many-flowered, radiate; the long and narrowly wedge-shaped rays neutral. Involucre short, of many thickish small bracts imbricated in 3–4 rows, the outer obovate and obtuse. Receptacle strongly convex, with deep honeycomb-like cells containing the obconical or oblong silky-villous achenes; pappus of 7–9 lance-oblong erect chaffy scales. — Perennial herb, smoothish; the slender simple stems 6–9 dm. high, bearing alternate oblanceolate leaves, and a large showy long-pedunculate head. Rays yellow, 2.5 cm. long; disk often turning dark purple. (Named for *Dr. William Baldwin*, 1779–1819, discriminating amateur botanist, friend of Muhlenberg.) ACTINOSPERMUM Ell.

1. B. uniflòra Nutt. (*Actinospermum* Barnhart.) — Borders of swamps, from Va. (?) southw. Aug.

58. MARSHÁLLIA Schreb.

Heads many-flowered; flowers all tubular and perfect; corolla-lobes slender and spreading. Involucral bracts linear-lanceolate, foliaceous, erect, in 1–2 rows, nearly equal. Receptacle convex or conical, with narrowly linear rigid chaff. Achenes top-shaped, 5-angled; pappus of 5 or 6 membranaceous pointed scales. — Smooth low perennials, with alternate entire 3-nerved leaves, and long-pedunculate heads terminating the simple stem or branches. Flowers purplish; anthers blue. (Named at the request of Muhlenberg for *Dr. Moses Marshall*, nephew of the more distinguished Humphrey Marshall.)

1. M. trinérvia (Walt.) Porter. *Stems leafy; leaves* ovate-lanceolate, pointed, sessile but *not amplexicaul*, 6–7.5 cm. long. (*M. latifolia* Pursh.) — Dry soil, Va., and southw.

2. M. obovàta (Walt.) Beadle & Boynton. *Leaves chiefly basal*, narrowly obovate, obtusish or rounded at the apex; involucral bracts linear-oblong, blunt; chaff spatulate, more or less distinctly expanded at the tip, blunt; achenes longer than pappus. — River-banks and open woods, s. w. Pa., and southw.

Var. platyphýlla (Curtis) Beadle & Boynton. *Stem leafy about to the middle; leaves* lanceolate, narrowed to an obtusish tip, *conspicuously amplexicaul.* — Dry open woods, etc., Pa., and southw. *M. grandiflora* Beadle & Boynton appears to be only a very robust form or state of this variety, with stems 4–7 dm. high, and cauline leaves 2–3 cm. wide.

59. GALINSÒGA R. & P.

Heads several-flowered, radiate; rays 4–5, small, roundish, pistillate. Involucre of 4–5 ovate thin bracts. Receptacle conical, with narrow chaff. Pappus of small oblong cut-fringed chaffy scales, sometimes wanting. — Annual herbs, with opposite triple-nerved thin leaves, and small heads; disk yellow; rays white or reddish. (Named for *Dr. Mariano Martinez de Galinsoga*, a Spanish botanist.)

* *Rays white; pappus of disk-flowers about equaling the achenes.*

1. G. PARVIFLÒRA Cav. Pubescence subappressed; leaves ovate, crenate-serrate, petioled; pappus of the disk-flowers of spatulate obtusish scales. — Roadsides and waste places, from N. E. across the continent. (Adv. from Trop. Am.) Var. HÍSPIDA DC. Pubescence more copious, not appressed; pappus-scales of the disk-flowers attenuate and bristle-tipped. — Me. to Ont., Wisc., and southw. (Nat. from Trop. Am.)

* * *Rays reddish; pappus of disk-flowers about half as long as the achenes.*

2. G. CARACASÀNA (DC.) Sch. Bip. Pubescence loose and often rather copious; leaves as in no. 1. (*G. hispida* Benth.) — Waste land, Camden, N. J.; about mills, etc., Cumberland, Md. (*Schriver*), and probably elsewhere. (Adv. from Trop. Am.)

60. FLAVÈRIA Juss.

Heads 3–15-flowered, usually with but 1 ray-flower; flowers all fertile. Involucral bracts few, subequal or 1–2 of the outer much shorter. Receptacle small, naked or setose. Achenes oblong, 8–10-ribbed, glabrous; pappus none. — Opposite-leaved annuals with clustered small yellowish heads. (Name from *flavus*, yellow, the plant being used in dyeing.)

1. F. campéstris Johnston. Erect and glabrous, 3–6 dm. high, branched above; leaves linear or lanceolate, 3-nerved, mostly serrulate; heads subsessile, in mostly terminal glomerules; involucre 3-bracteate, 2–5-flowered. (*F. angustifolia* of auth., not Pers.) — Alkaline soil, w. Mo. (*Bush*) to Col. and Mex. May–Sept.

61. HYMENOPÁPPUS L'Hér.

Heads many-flowered; flowers all tubular and perfect, with large revolute corolla-lobes. Involucral bracts 6–12, loose and broad, thin, the upper part petal-like, usually white. Receptacle small, naked. Achenes top-shaped, with a slender base, striate; pappus of 15–20 blunt scales in a single row, very thin (whence the name of the genus, from ὑμήν, *membrane*, and πάππος, *pappus*.) — Biennial or perennial herbs, with alternate mostly dissected leaves, and corymbed small heads of usually whitish flowers.

* *Pappus of very small roundish nerveless scales.*

1. H. carolinénsis (Lam.) Porter. Somewhat flocculent-woolly when young, *leafy to the top*, 3–9 dm. high; leaves 1–2-pinnatèly parted into linear or oblong lobes; involucral bracts roundish, mainly whitish; pappus-scales very small, roundish, nerveless. (*H. scabiosaeus* L'Hér.) — Sandy barrens, Ill. to S. C., and southw. May, June.

2. H. corymbòsus T. & G. More slender, glabrate, *naked above;* bracts obovate-oblong, petaloid at apex. — Woods and plains, Mo. and Neb. to Tex.

62. POLÝPTERIS Nutt.

Heads few-flowered, small; flowers all tubular, deeply 5-parted. Involucral bracts 8–10, herbaceous. Achenes slender-obpyramidal; pappus of short rounded pales or wanting. — Scabrous herbs with narrow short-petioled mostly alternate leaves, and pedunculate loosely corymbose or paniculate small purplish

heads. (Name from πολύ-, *many*, and πτέρις (πτερόν), *wing*, referring to the pappus of some species.)

1. **P. callòsa** (Nutt.) Gray. Annual, slender, 6 dm. or less in height; leaves linear; peduncles glandular; involucral bracts with dry reddish tips. — Dry soil, Mo. to Tex., etc.

63. ACTÍNEA Juss.

Heads many-flowered; rays several, wedge-oblong, 3-toothed, pistillate. Bracts of the hemispherical involucre ovate or lanceolate, membranaceous or coriaceous, nearly equal, in 2–3 ranks, little shorter than the disk. Achenes top-shaped, densely silky-villous; pappus of 5 or more ovate or lanceolate very thin chaffy scales. — Low herbs, with narrow alternate leaves, dotted with resinous atoms and bitter-aromatic; the solitary heads terminating scapes or slender naked peduncles; flowers yellow. (Name from ἀκτίς, *ray*.) ACTINELLA Pers. PICRADENIA Hook. TETRANEURIS Greene.

1. **A. herbàcea** (Greene) Robinson. Perennial, caespitose; branches of the caudex rather stout, bearing numerous thickish spatulate to linear 1-nerved sparingly villous glandular-punctate leaves and scape-like peduncles (villous or lanate especially toward the summit); heads (including the showy rays) 3–4 cm. in diameter. (*Tetraneuris* Greene; *Actinella acaulis*, var. *glabra* Gray, in part.) — Ottawa Co., O., and about Joliet, Ill.

64. HELÈNIUM L. SNEEZEWEED

Heads many-flowered, radiate; rays several, wedge-shaped, 3–5-cleft, fertile, rarely sterile. Involucre small, reflexed; the bracts linear or awl-shaped. Receptacle globose or ellipsoid. Achenes top-shaped, ribbed; pappus of 5–8 thin 1-nerved chaffy scales, the nerve usually extended into a bristle or point. — Erect branching herbs with alternate leaves, often sprinkled with bitter aromatic resinous globules; heads yellow, rarely purple, terminal, single or corymbed. (The Greek name of some plant, said to be named after *Helenus*, son of Priam.)

* *Leaves broad, decurrent on the angled stem.*

1. **H. nudiflòrum** Nutt. Perennial, somewhat puberulent, 3–9 dm. high; *leaves* narrowly lanceolate or oblong to linear, *entire*, or the radical spatulate and dentate; *heads mostly small*; disk brownish, globose; rays yellow or partly brown-purple, sterile (neutral or style abortive), shorter than or exceeding the disk. — Ill. and Mo. to N. C. and Tex.; also abundantly established locally from N. E. to Pa. June–Aug. — Hybridizes with the next.

2. **H. autumnàle** L. Perennial, nearly smooth, 0.2–2 m. high; *leaves mostly toothed*, lanceolate to ovate-oblong; *heads larger* (2–4 *cm. broad*); disk yellow; rays fertile, yellow. — Alluvial river-banks and wet ground, w. Que. and w. Mass. to Man., southw. and westw. Aug.–Oct.

** *Leaves linear-filiform, not decurrent.*

3. **H. tenuifòlium** Nutt. Glabrous annual, much branched, very leafy; heads 1.5–2 cm. broad; rays fertile. — Prairies, roadsides, etc., Va. to Kan., and southw.; locally established by railroads, etc., northeastw. to e. Mass.

65. GAILLÁRDIA Foug.

Heads many-flowered; rays 3-cleft or -toothed, neutral or sometimes fertile, or none. Involucral bracts in 2–3 rows, the outer larger, loose, and foliaceous. Receptacle convex to globose, with bristle-like or subulate or short and soft chaff. Achenes top-shaped, 5-costate, villous; pappus of 5–10 long thin awn-tipped scales. — Erect alternate-leaved herbs with long-peduncled showy heads of yellow or purplish fragrant flowers. (Named after *Gaillard de Charentonneau*, a botanical amateur.)

1. **G. lùtea** Greene. Erect or nearly so, 4 dm. or more in height, *puberulent and somewhat scabrous*, leafy-stemmed, branched above; branches ascending; leaves oblong-lanceolate, somewhat amplexicaul at the broadish base, toothed or subentire; *both disk-flowers and rays yellow.* (*G. lanceolata* of auth., in part, not Michx.) — Mo. (*Bush*) to Tex.

2. **G. aristàta** Pursh. Perennial, *hirsute;* leaves lanceolate to oblanceolate broad or narrow, entire to coarsely pinnatifid; *disk-flowers brownish-purple;* rays usually numerous and long, yellow; chaff bristly or subulate. — Minn. to Man., westw. and southw.; now spreading eastw.

66. DYSSÒDIA Cav. Fetid Marigold

Heads many-flowered, usually radiate; rays pistillate. Involucre of 1 row of bracts united into a firm cup, with a few loose bracts at the base. Receptacle flat, beset with short chaffy bristles. Achenes slender, 4-angled; pappus a row of chaffy scales, dissected into numerous rough bristles. — Herbs, mostly annuals or biennials, dotted with large pellucid glands, which give a strong odor; heads terminating the branches; flowers yellow. (Name δυσωδία, *an ill smell*, which the plants exemplify.) Boebera Willd.

1. **D. pappòsa** (Vent.) Hitchc. Nearly smooth, diffusely branched, 1–5 dm. high; leaves opposite, pinnately parted, the narrow lobes bristly-toothed or cut; rays few, scarcely exceeding the involucre. (*D. chrysanthemoides* Lag.) — Roadsides and banks of rivers, Minn. to Ill., Tenn., and southwestw.; occasional as a weed further eastw. July–Oct.

67. ACHILLÈA [Vaill.] L. Yarrow

Heads many-flowered, radiate; the rays few, fertile. Involucral bracts imbricated, with scarious margins. Receptacle chaffy, flattish. Achenes oblong, flattened, margined; pappus none. — Perennial herbs, with small corymbose heads. (So named because its virtues are said to have been discovered by *Achilles.*)

* *Leaves simple; involucre hemispherical; receptacle low.*

1. **A. Ptármica** L. (Sneezeweed.) Stem rather rigid, smooth or slightly pubescent; *leaves lance-linear*, finely appressed-serrate; corymb loose, the heads long-pediceled; *rays* 8–12, white, *much longer than the involucre.* — Damp fields, etc., Nfd. to Mich. and Mass., local. Aug., Sept. (Introd. from Eu.)

* * *Leaves bipinnately parted; involucre slender-cylindric; receptacle becoming elongated.*

← *Rays comparatively showy, their blades* $\frac{1}{2}$–$\frac{2}{3}$ *as long as the involucre; bracts with dark brown or black margins.*

2. **A. boreàlis** Bongard. Stem erect, 0.5–4 dm. high, more or less lanate; *stem-leaves few* (5–9), silky-lanate especially beneath; *corymbs* 2–6 *cm. broad, very convex;* involucre 4–6 mm. long, its *bracts all dark-margined; rays* 10–20, white (rarely pink), short-oblong or suborbicular, 2.5–4 *mm. long.* — Wet rocks and mossy slopes, Lab. to Alaska, s. to Nfd., e. Que., and along the Rocky Mts. to N. Mex. June–Aug. (Boreal Eurasia.)

← ← *Rays small, their blades rarely* $\frac{1}{2}$ *as long as the involucre; bracts pale, very rarely the uppermost dark-margined.*

3. **A. Millefòlium** L. (Common Y., Milfoil.) *Stem* simple or sometimes forked above, 3–10 dm. high, *arachnoid or nearly smooth; stem-leaves numerous* (8–15), smooth or loosely pubescent; *corymbs* very compound, 6–20 cm. broad, *flat-topped*, the branches stiff; involucre 3–5 mm. long, its bracts all pale, or in exposed situations the uppermost becoming dark-margined; rays 5–10, white to crimson, short-oblong, 1.5–2.5 mm. long. — Fields and river-banks, common. (Eurasia.)

4. **A. lanulòsa** Nutt. Similar; *stem* 3–6 dm. high, *densely woolly;* stem-

leaves silky-lanate; *corymbs* 2–10 cm. broad, *very convex;* involucre pubescent, none of its bracts dark-margined; rays 1–2.5 mm. long. — Gravelly shores and open ground, Gulf of St. Lawrence to Mich., thence westw. and southwestw.; naturalized in the Eastern States. (Mex.)

68. ÁNTHEMIS [Mich.] L. Chamomile

Heads many-flowered, radiate; rays pistillate or (in no. 1) neutral. Involucre hemispherical, of many small imbricated dry and scarious bracts shorter than the disk. Receptacle conical, usually with slender chaff at least near the summit. Achenes terete or ribbed, glabrous, truncate; pappus none or a minute crown. — Branching often strong-scented herbs, with pinnately dissected leaves and solitary terminal heads; rays white or yellow (rarely wanting); disk yellow. (Ἀνθεμίς, the ancient Greek name of the Chamomile.)

1005. A. Cotula. Leaf and ray × 1⅓.

* *Rays white.*

← *Chaff of the receptacle sharp-pointed.*

1. A. Cótula L. (May-weed, Dog Fennel.) Annual, acrid, *ill-scented;* leaves finely 3-pinnately dissected; rays mostly neutral; *receptacle without chaff near the margin;* pappus none; *achenes tuberculate-roughened.* (*Maruta* DC.) — Common by roadsides. (Nat. from Eu.) Fig. 1005.

2. A. arvénsis L. (Corn C.) Pubescent annual or biennial, resembling May-weed, but *not ill-scented;* leaves less finely 1–2-pinnately parted; *chaff* of the receptacle lanceolate, pointed, *subtending all the disk-flowers* and distinctly exceeding them; *achenes smooth on the sides;* pappus a minute border. — Roadsides, waste places, etc., occasional. (Adv. from Eu.) Fig. 1006. Var. agréstis (Wallr.) DC. Chaff of the receptacle shorter than the disk-flowers. — Fields, etc., becoming frequent. (Nat. from Eu.)

1006. A. arvensis. Leaf and ray × 1⅓.

← ← *Chaff of the receptacle blunt.*

3. A. nóbilis L. (Garden C.) More downy and *perennial*, pleasantly strong-scented; sterile shoots depressed or creeping; leaves very finely dissected; pappus none. — Occasionally spontaneous about old gardens. (Introd. from Eu.)

* * *Rays yellow.*

4. A. tinctória L. (Yellow C.) Pubescent perennial; leaves pinnately divided; heads long-peduncled, 3–4 cm. broad; chaff of the receptacle lanceolate; pappus a short crown. — Fields and waste places, becoming frequent. (Nat. from Eu.)

A. aúrea (L.) DC., with small rayless heads has been found near St. Louis, Mo. (*Engelmann*).

69. MATRICÀRIA [Tourn.] L. Wild Chamomile

Heads many-flowered; rays pistillate or wanting. Bracts of the involucre imbricated, with scarious margins. Receptacle conical (at least in fruit), naked. Achenes 3–5-ribbed, wingless; pappus a membranaceous crown or border, or none. — Smooth and branching herbs (ours annuals or biennials) with finely divided leaves and single or corymbed heads. Rays white or none; disk yellow. (Named for reputed medicinal virtues.)

1. M. inodòra L. Leaves bipinnately divided into fine almost filiform lobes; *heads large, 3–4 cm. broad,* naked-peduncled, and *with many long rays;* achenes

1007. M. inodora. Leaf × 1⅓.

strongly 3-ribbed; *pappus a short crown or border.* — Roadsides and fields, Nfd. to Ct. and Mich.; abundant in e. Me. and adjacent Canada. July, Aug. (Nat. from Eu.) Fig. 1007.

2. M. Chamomílla L. Similar; *heads* smaller, *about* 2 *cm. broad;* rays shorter; receptacle more convex; achenes less distinctly ribbed; *pappus obsolete.* — Roadsides and waste places, Atlantic States, west to O. (Adv. from Eu.)

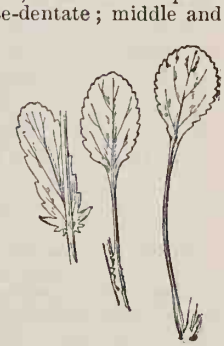
3. M. suavèolens (Pursh) Buchenau. (Pineapple-weed.) Low; leaves 2–3-pinnately-parted into short linear lobes; *heads rayless*, short-peduncled; bracts oval, with broad margins, much shorter than the conical disk; achenes more terete; pappus obsolete; odor of the bruised plant suggesting pineapple. (*M. discoidea* DC.; *M. matricarioides* Porter.) — Roadsides and old fields, locally abundant in N. B., N. E., N. Y., and Pa.; also about St. Louis, Mo.; naturalized, probably from the Pacific slope, where it is common. (Established in n. Eu.)

70. CHRYSÁNTHEMUM [Tourn.] L. Ox-eye Daisy

Heads many-flowered; rays numerous, fertile. Scales of the broad and flat involucre imbricated, with scarious margins. Receptacle flat or convex, naked. Disk-corollas with a flattened tube. Achenes of disk and ray similar, striate. — Annual or perennial herbs, with toothed, pinnatifid, or divided leaves, and single or corymbed heads. Rays white or yellow (rarely wanting); disk yellow. (Old Greek name, χρυσάνθεμον, i.e. *golden flower.*)

* *Heads large, solitary, terminating the long branches.*

1. C. Leucánthemum L. (Ox-eye or White Daisy, Marguerite, White-weed.) Stem erect, simple or forked toward the summit; basal leaves spatulate-obovate, on long slender petioles, the blades crenate-dentate; middle and upper stem-leaves oblong or oblanceolate, coarsely and regularly crenate or dentate above, with larger spreading teeth at base; heads 4–6 cm. broad; *involucral bracts narrow, brown-margined; rays white* (rarely tubular, laciniate, or deformed). — Fields, etc., Nfd. and e. Que. to N. J.; rare southw. June–Aug. (Nat. from Eu.) Fig. 1008.



1008. C. Leucanthemum. Leaves × ½.

Var. pinnatífidum Lecoq & Lamotte. Basal leaves pinnatifid, subpinnatifid, or coarsely and irregularly toothed; middle and upper stem-leaves narrowly oblong or oblanceolate, conspicuously subpinnatifid at base; heads usually smaller than in the typical form. (Var. *subpinnatifidum* Fernald.) — Fields and meadows, throughout; an abundant and pernicious weed eastw. (Nat. from Eu.) Fig. 1009.

1009. C. Leuc., v. pinnat. Leaves × ½.

2. C. ségetum L. (Corn Chrysanthemum, Corn Marigold.) Similar; leaves oblong, somewhat clasping, coarsely toothed or pinnatifid; *rays golden-yellow; bracts broad and scarious.* — Ballast along the coast, N. B. to N. J.; also in fields near Schenectady, N. Y. (*Wibbe*). (Adv. from Eu.)

* * *Heads small, corymbed.*

3. C. Parthènium (L.) Bernh. (Feverfew.) Tall, branched, leafy; *leaves bipinnately divided, the divisions ovate, cut; rays white.* — Escaped from gardens, and naturalized in some places. (Introd. from Eu.)

4. C. Balsámita L., var. tanacetoìdes Boiss. (Costmary, Mint Geranium.) *Leaves oblong, crenate*, the upper sessile, the lower petioled, often

with 2 small lateral lobes at base; *heads rayless.* — Frequently escaped from gardens. (Introd. from Asia.)

71. TANACÈTUM L. Tansy

Heads many-flowered, nearly discoid; flowers all fertile, the marginal chiefly pistillate and 3–5-toothed. Involucre imbricated, dry. Receptacle convex, naked. Achenes angled or ribbed, with a large flat top; pappus a short crown. — Bitter and acrid mostly strong-scented herbs (ours perennial), with 1–3-pinnately dissected leaves, and corymbed (rarely single) heads. Flowers yellow, in summer. (Name of uncertain derivation.)

1. **T.** vulgàre L. (Common T.) Stem 0.5–1 m. high, *smooth;* leaflets and the wings of the petiole cut-toothed; *corymb dense;* pistillate flowers terete, with oblique 3-toothed limb; pappus 5-lobed. — Escaped from gardens to roadsides, etc. (Introd. from Eu.) Var. crispum DC. Leaves more cut and crisped. — Frequent in similar places. (Introd. from Eu.)

2. **T. huronénse** Nutt. Hairy or *woolly* when young, stout, 3–9 dm. high; lobes of leaves oblong; *heads* large (1–2 cm. wide) and usually *few;* pistillate flowers flattened, 3–5-cleft; pappus toothed. — River-banks, e. Que. to N. B. and n. Me.; shores of the upper Great Lakes; coast of Ore., Wash., and B. C.

72. CÓTULA [Tourn.] L.

Heads hemispherical to globose, many-flowered, discoid; the marginal flowers (reduced rays) pistillate and fertile, nearly or quite apetalous; disk-flowers tubular, 4-toothed, fertile. Chaff none. Achenes at maturity raised on pedicels, which remain attached to the flat or moderately convex receptacle. Pappus obsolete or none. — Low mostly diffuse or creeping strong-scented herbs, with alternate toothed, lobed, or dissected leaves, and pedunculate heads of yellow flowers. (Name from κοτύλη, *a small cup*, alluding to the hollow at the base of the amplexicaul leaves.)

1. **C.** coronopifòlia L. Branched from the base, decumbent and often somewhat repent, slightly fleshy, nearly or quite smooth; leaves linear-oblong, irregular, 3-many-toothed; heads at length subglobose, about 1 cm. in diameter, on slender terminal peduncles. — Brackish mud, P. E. I. (*Churchill*); on ballast about Chelsea, Mass.; also on the Pacific coast. (Adv. from s. Afr.)

73. ARTEMÍSIA L. Wormwood

Heads discoid, few–many-flowered; flowers all tubular, the marginal ones pistillate, or sometimes all similar and perfect. Involucre imbricated, dry and scarious. Receptacle small and flattish, naked. Achenes obovoid, with a small summit and no pappus. — Herbs or shrubby plants, bitter and aromatic, with small commonly nodding heads in panicled spikes or racemes; flowering in summer. Corolla yellow or purplish. (Ancient name of the Mugwort, in memory of *Artemisia*, wife of Mausolus.)

§ 1. *Receptacle smooth; marginal flowers pistillate and fertile; disk-flowers perfect but sterile, the style mostly entire; root perennial, except in no.* 1.

* *Leaves dissected.*

1. **A. caudàta** Michx. Glabrous or silky, 0.5–1.5 m. high; upper leaves pinnately, the lower 2–3-pinnately divided; *the divisions thread-form,* diverging; *heads small* (2–3 *mm. broad*); *the racemes in a wand-like elongated panicle;* root biennial. — Sandy soil, Atlantic coast; also Vt. to Man., westw. and southwestw.

2. **A. canadénsis** Michx. Smooth, or hoary with silky down, 3–6 dm. high; *lower leaves bipinnately divided, the upper 3–7-divided; divisions linear, rather rigid; heads rather large* (4–6 *mm. broad*), *in panicled racemes: involucre*

generally glabrous, *green;* root perennial. — Calcareous rocks, Nfd. to B. C., s. to n. N. E., Minn., etc. (Eu.)

3. A. **boreàlis** Pall. Similar, 1–3 dm. high; *lower leaves* 1–2-*ternately divided; upper* linear, *mostly entire;* heads fewer, subracemose; *involucre* pilose or glabrate, *brownish;* root perennial. — Arctic regions, s. to the serpentine mts. of e. Que., Keweenaw Point, Mich., Col., and Wash. (Asia.)

* * *Leaves entire or some* 3-*cleft.*

4. A. **dracunculoìdes** Pursh. Tall (0.5–1.5 m.), somewhat woody at base, *slightly hoary or glabrous; leaves narrowly linear* and entire or the lower 3-cleft; heads small and numerous, panicled. — Sandy banks and prairies, Man. to Ill., Mo., westw. and southwestw.

5. A. **glaùca** Pall. Strict, 3–6 dm. high, somewhat woody at base, minutely *silky-pubescent or glabrate and glaucous; leaves linear- to oblong-lanceolate;* heads as in the preceding. — Prairies, Sask. to Minn. and N. Dak. (Siber.)

§ 2. *Receptacle smooth; flowers all fertile, a few pistillate, the others perfect*

Two cultivated shrubby species, from Europe, with filiformly divided leaves. have occasionally escaped from gardens and become spontaneous, *viz.* A. ABRÓTANUM L. (the SOUTHERNWOOD), of strict habit, with 1–2-pinnatifid leaves and pubescent heads; and A. PRÓCERA Willd., with more spreading branches, all the leaves finely 2-pinnatifid, and heads glabrous.

* *Branching perennials, whitened with fine and close-pressed wool; heads small, in leafy panicles.*

6. A. **serràta** Nutt. Very leafy, 1.5–3 m. high; *leaves* lanceolate or the upper linear, *serrate,* white-tomentose beneath, green above; *heads greenish, subcylindric,* 4.3 *mm. long or less.* — Ill. to S. Dak.; sparingly naturalized eastw.

7. A. **longifòlia** Nutt. Stem 0.5–1.5 m. high; *leaves* linear or linear-lanceolate, *entire,* usually glabrate above; *heads subcylindric, canescent,* 4–6 *mm. long.* — Minn. to Neb., and westw.

8. A. **ludoviciàna** Nutt. (WESTERN MUGWORT, WHITE SAGE.) *Whitened-woolly* throughout; *leaves lanceolate,* the upper *mostly entire,* the lower usually cut-lobed, toothed or pinnatifid, the upper surface sometimes glabrate and green; *heads campanulate,* mostly sessile in slender panicles. (Including *A. gnaphalodes* Nutt.) — Dry banks, Sask. to Mich., Ill., Tex., and westw.; locally naturalized eastw. — Very variable.

9. A. VULGÀRIS L. (COMMON MUGWORT.) Tall; *leaves mostly glabrous and green above,* the lower surface (and the branches) white-woolly, *all pinnatifid,* with the *divisions often cut-lobed, linear-lanceolate;* heads small, in open panicles. — Waste places and roadsides, and along streams, e. Que. to Ont. and Pa. (Nat. from Eu.)

10. A. KANSÀNA Britton. Low, 1–6 dm. high; *leaves finely pinnatifid into linear segments;* heads densely woolly, in strict close panicles. — Plains and foot-hills, w. Kan., Col., and N. Mex.; adventive eastw.

* * *Densely white-tomentose, perennial; heads large, racemose-glomerate; involucral bracts herbaceous.*

11. A. STELLERIÀNA Bess. (BEACH W., DUSTY MILLER, OLD WOMAN.) Stout, 3–6 dm. high, from a creeping base; leaves obovate or spatulate, pinnatifid, the lobes obtuse. — Sandy sea-beaches, e. Que. to N. J., and shores of Oneida L., N. Y. (*Haberer*); commonly cultivated in old gardens, and recently spreading extensively to sandy soil. (Introd. from n. e. Asia.)

* * * *Less branched, biennial or annual, glabrous.*

12. A. **biénnis** Willd. Strict, tall; lower leaves 2-pinnately parted, the upper pinnatifid; lobes linear, acute, in the lower leaves cut-toothed; *heads in short axillary spikes or clusters, crowded in a slender and glomerate leafy panicle.* — Gravelly banks, O. to Tenn., Mo., and northwestw.; now established eastw. by railroads and in waste places.

13. **A. Annua** L. Much branched, *very sweet-scented;* leaves 2-pinnately divided, the oblong segments deeply pinnatifid; *heads* small, *in a loose ample panicle.* — Waste places, etc., throughout, locally a bad weed. (Nat. from Old World.)

§ 3. *Receptacle hairy; flowers all fertile, the marginal ones pistillate.*

14. **A. Absínthium** L. (Wormwood.) Rather shrubby, 6–9 dm. high, silky-hoary; *leaves 2–3-pinnately parted; lobes lanceolate; heads hemispherical, panicled.* — Roadsides, dry banks, etc., thoroughly established and common, e. Can. and n. N. E.; elsewhere local. (Nat. from Eu.)

15. **A. frígida** Willd. Low (1.5–5 dm. high), in tufts, slightly woody at the base, white-silky; *leaves pinnately parted and 3–5-cleft, the divisions narrowly linear; heads globose, racemose.* — Dry hills and rocks, Sask. to Minn., w. Tex., and westw.

74. TUSSILÀGO [Tourn.] L. Coltsfoot

Head many-flowered; ray-flowers in several rows, narrowly ligulate, pistillate, fertile; disk-flowers with undivided style, sterile. Involucre nearly simple. Receptacle flat. Achenes slender-cylindric or prismatic; pappus copious, soft, and capillary. — Low perennial, with horizontal creeping rootstocks, sending up scaly scapes in early spring, bearing a single head, and producing rounded-heart-shaped angled or toothed leaves later in the season, woolly when young. Flowers yellow. (Name from *tussis*, a cough, for which the plant is a reputed remedy.)

1. **T. Fárfara** L. — Wet places and along brooks, e. Que. to Pa., O., and Minn. (Nat. from Eu.)

75. PETASÌTES [Tourn.] Hill. Sweet Coltsfoot

Heads many-flowered, somewhat dioecious; in the substerile plant with a single row of ligulate pistillate ray-flowers, and many tubular sterile ones in the disk; in the fertile plant wholly or chiefly of pistillate flowers, tubular or distinctly ligulate. Otherwise as *Tussilago.* — Perennial woolly herbs, the leaves all from the rootstock, the scape with sheathing scaly bracts, bearing heads of purplish or whitish fragrant flowers in a corymb. (The Greek name for the Coltsfoot, from πέτασος, a broad-brimmed hat, on account of its large leaves.)

* *Pistillate flowers ligulate; flowers whitish.*

+ *Leaves deeply lobed.*

1. **P. palmàtus** (Ait.) Gray. *Leaves* rounded, somewhat *kidney-form, palmately and very deeply 5–7-lobed*, the lobes toothed and cut. — Woods, swamps, and recent clearings, Lab., to Alb., s. to e. Mass., w. Ct., N. Y., Mich., Wisc., and Minn. Apr.–June. — Full-grown leaves 1–2.5 dm. broad.

+ + *Leaves shallowly or not at all lobed.*

2. **P. trigonophýllus** Greene. *Leaves from broadly cordate-deltoid to suborbicular*, closely invested beneath with dense white tomentum, the 7–11 *shallow lobes* more or less sharply toothed, in maturity 0.5–1.5 dm. broad. — Wet meadows, local, Gaspé Co., Que., Sask., and n. Minn. May.

3. **P. sagittàtus** (Pursh) Gray. *Leaves deltoid-oblong to reniform-hastate*, acute or obtuse, repand-dentate, very white-tomentose beneath, when fully grown 1.7–2.5 dm. broad. — Cold swamps, Lab. to B. C., s. to Minn., Col., etc. May June.

* * *Ligules none; flowers purplish.*

4. **P. vulgàris** Hill. (Butterbur.) Rootstock very stout; leaves round-cordate, angulate-dentate and denticulate. — Waste or cultivated ground, e. Mass. and e. Pa. Apr.. May. (Nat. from Eu.)

76. ÁRNICA L.

Heads many-flowered; rays pistillate. Bracts of the bell-shaped involucre lanceolate, equal, somewhat in 2 rows. Receptacle flat, fimbrillate. Achenes slender or spindle-shaped; pappus a single row of rather rigid and strongly roughened-denticulate bristles. — Perennial herbs (chiefly of mountains and cold northern regions), with simple stems, bearing single or corymbed large heads and opposite leaves. Flowers yellow. (Name thought to be a corruption of *Ptarmica.*)

* *Basal leaves petioled; stem leafy.*

+ *Basal leaves tapering to the petiole.*

++ *Pappus barbellate, bright white.*

1. **A. chionopáppa** Fernald. *Stem* 0.7–3.5 dm. high, *villous with flat white hairs; leaves* 3–5 pairs, *lanceolate to narrowly ovate*, mostly confined to the lower half of the stem, the basal on very long slender petioles; the *lower cauline petioled, the upper sessile and much reduced;* heads 1–3, 3–4 cm. broad; *involucre villous*, the linear- or lance-attenuate *bracts* 7–10 *mm. long;* achenes 3.5–5 mm. long, densely setulose; pappus in fruit 5–6.5 mm. long. — Cold limestone cliffs and ledges, e. Que. and n. N. B. June, July.

++ ++ *Pappus plumose, sordid.*

2. **A. móllis** Hook. *Stem* 1.5–7 dm. high, more or less *crisp-villous* throughout, *somewhat glandular above; leaves oblanceolate to ovate*, the basal slender-petioled; the *cauline* (3–5 pairs) *mostly sessile*, 0.3–1.5 dm. long, *the uppermost only slightly smaller;* heads 1–9, on short (3–12 cm. long) naked or rarely bracted glandular-villous peduncles, 4–6 cm. broad; *involucre glandular and villous*, its lance-attenuate often purple-tipped *bracts* 1–1.6 *cm. long;* achenes hirsute, 4–5 mm. long, shorter than the plumose yellow-brown or olive-tinged pappus. (*A. Chamissonis* Man., ed. 6, not Less.; *A. lanceolata* Nutt.) — Banks of streams, e. Que. to B. C., s. to the mts. of Me. and N. H., Col., and Cal. June–Aug.

Var. **petiolàris** Fernald. *Leaves narrow*, oblanceolate, all but the very uppermost *tapering to slender petioles; heads* 3–4 *cm. broad; involucral bracts scarcely* 1 *cm. long.* — By alpine brooks, Me., N. H., and n. N. Y.

+ + *Basal leaves rounded or cordate at base.*

3. **A. cordifòlia** Hook. Stem 1.5–6 dm. high, more or less villous throughout, glandular above; basal and lower cauline leaves ovate, coarsely dentate, slender-petioled, upper short-petioled or subsessile; heads 1–8, slender-peduncled, 5–7 cm. broad; involucre villous, especially at base; bracts lanceolate to oblong, acuminate, 1.3–2 cm. long; rays about 15; achenes hirsute; pappus white, barbellate. — Very local, n. Mich.; Yukon to S. D., Col., Utah, and Cal.

* * *Basal leaves rosulate, broad and sessile; stem-leaves remote and small.*

4. **A. acaúlis** (Walt.) BSP. Hairy and rather glandular, 1 m. or less in height; *leaves thickish*, 3–5-*nerved*, *ovate or oblong;* heads several, corymbed, showy. (*A. nudicaulis* Nutt.) — Damp pine barrens, Del., s. Pa., and southw. May, June.

77. ERECHTÌTES Raf. Fireweed

Heads many-flowered; the flowers all tubular and fertile; the marginal pistillate, with a slender corolla. Bracts of the cylindrical involucre in a single row, linear, acute, with a few small bractlets at the base. Receptacle naked. Achenes oblong, tapering at the end; pappus copious, of very fine and white soft hairs. — Erect and coarse annuals, of rank smell, with alternate simple leaves, and paniculate-corymbed heads of whitish flowers. (The ancient name of some species of Groundsel, probably called after *Erechtheus.*)

1. **E. hieracifòlia** (L.) Raf. Often hairy; stem grooved, 0.3 to 3 m. high;

leaves lanceolate or oblong, acute, cut-toothed, sessile, the upper auricled at base or petioled. — Moist woods, and in recently burned clearings, whence the popular name; common, especially northw. July–Sept.

78. CACÀLIA L. Indian Plantain

Heads 5–many-flowered; the flowers all tubular and perfect. Involucral bracts in a single row, erect, connivent, with a few bractlets at the base. Receptacle naked. Corolla deeply 5-cleft. Achenes oblong or slender-cylindric, smooth; pappus of numerous soft capillary bristles. — Smooth and tall perennial herbs, with alternate often petioled leaves, and rather large heads in flat corymbs. Flowers white or whitish. (An ancient name, of uncertain meaning.)

* *Involucre 25–30-flowered, with several bracts at its base; receptacle flat.*

1. **C. suavèolens** L. Stem grooved, 1–1.6 m. high; *leaves triangular-lanceolate, halberd-shaped*, pointed, serrate, those of the stem on winged petioles. (*Synosma* Raf.) — River-banks, rich woods, etc., Ct. to Ia., Minn., and southw. in the Allegheny region to Fla.; Newton, Mass. (*Farlow*), where probably an escape. Aug., Sept.

* * *Involucre 5-bracted and 5-flowered, its basal bracts minute or none; receptacle bearing a more or less evident scale-like pointed appendage in the center.*

2. **C. renifórmis** Muhl. (Great Indian P.) Not glaucous; stem 1–3 m. high, grooved and angled; *leaves green on both sides, dilated-fan-shaped, or the lowest kidney-form*, 3–6 dm. broad, *repand-toothed* and angled, palmately veined, petioled; the teeth pointed; corymbs large. (*Mesadenia* Raf.) — Rich damp woods, N. J. to Minn., and southw. along the mts. to N. C. and Tenn July, Aug.

3. **C. atriplicifòlia** L. (Pale Indian P.) Glaucous; stem terete, 1–2 m. high; *leaves palmately veined and angulate-lobed;* the lower triangular-kidney-form or slightly heart-shaped; the upper rhomboid or wedge-form, *toothed.* (*Mesadenia* Raf.) — Rich woodlands and prairies, N. J. to Minn., Kan., and southw. in the Alleghenies to Ga.

4. **C. tuberòsa** Nutt. Stem angled and grooved, 6–20 dm. high, from a thick tuberous root; *leaves green on both sides*, thick, strongly 5–7-*nerved;* the lower *lance-ovate or oval*, nearly entire, tapering into long petioles; the upper on short margined petioles, sometimes toothed at apex. (*Mesadenia* Britton.) — Wet prairies, etc., O. and w. Ont. to Minn., Kan., and southw.

79. SENÈCIO [Tourn.] L. Groundsel. Ragwort. Squaw-weed

Revised by J. M. Greenman

Heads many-flowered; rays pistillate or none; involucre cylindrical to bell-shaped, simple or with a few bractlets at the base, the bracts erect-connivent. Receptacle flat, naked. Pappus of numerous very soft and capillary bristles. — Ours herbs, with alternate leaves and solitary or corymbed heads. Flowers chiefly yellow. (Name from *senex*, an old man, alluding to the hoariness of many species, or to the white hairs of the pappus.)

a. Annuals (rarely becoming biennial); stems leafy to the inflorescence; heads medium-sized, 1 cm. or less high during anthesis *b.*
  b. Heads discoid . . . . . 1. *S. vulgaris.*
  b. Heads radiate; rays inconspicuous.
    Pubescence viscid-glandular . . . . . 2. *S. viscosus.*
    Pubescence not viscid-glandular . . . . . 3. *S. sylvaticus.*
  b. Heads radiate; rays conspicuous.
    Leaves irregularly laciniate-dentate to entire; plant pubescent . 4. *S. palustris.*
    Leaves lyrate or pinnately divided; plant glabrous . . . . 5. *S. glabellus.*
a. Biennials or perennials *c.*
  c. Heads medium-sized, in anthesis about 1 cm. long *d.*
    d. Stems leafy to the inflorescence; leaves mostly 2–3-pinnatisect . 6. *S. Jacobaea.*

d. Stems mostly leafy below, nearly naked above; leaves variable; the lower ovate, obovate, or oblanceolate; the upper much reduced, often bract-like *e.*
e. Pubescence when present floccose-lanate and confined chiefly to the base of the stem and to the leaf-axils *f.*
f. Heads discoid . . . . . 7. *S. discoideus.*
f. Heads radiate (except in *S. obovatus*, var. *elongatus*) *g.*
g. Lower leaves obovate, occasionally subrotund or oblong; stolons when well developed slender and creeping . 8. *S. obovatus.*
g. Lower leaves subrotund to lanceolate; the earliest leaves cordate or subcordate, usually long-petioled; stolons short and stout, assurgent.
Basal leaves all broad-ovate, deeply cordate and relatively large . . . . . 9. *S. aureus.*
Basal leaves mostly lanceolate; only the earliest ones subrotund, cordate, and relatively small . . . 10. *S. Robbinsii.*
g. Lower leaves oblong-oblanceolate to spatulate, usually narrowed gradually at the base; the earliest rarely subrotund or oblong.
Stem but slightly woolly at the base, comparatively few-headed . . . . . 11. *S. Balsamitae.*
Stem rather densely and permanently woolly at the base; heads usually numerous . . . . . 12. *S. Smallii.*
e. Pubescence white-lanate and more or less persistent over stem and leaves (rarely in no. 13 completely absent).
Basal leaves subrotund-ovate to oblong-lanceolate.
Stem-leaves deeply and irregularly divided . . . 13. *S. plattensis.*
Stem-leaves usually dentate, not deeply divided, only a few at most lyrate . . . . . 14. *S. tomentosus.*
Basal leaves oblong-obovate, oblanceolate, or spatulate.
Eastern species . . . . . 15. *S. antennariifolius*
Western species . . . . . 16. *S. canus.*
e. Pubescence of crisp-hirsute or subvillous hairs, not floccose or lanate, rarely quite glabrous . . . . . 17. *S. integerrimus.*
c. Heads larger, 1.5-2 cm. high during anthesis . . . . 18. *S. Pseudo-Arnica.*

1. **S. vulgàris** L. (Common Groundsel.) Low annual, 1–5 dm. high, corymbosely branched, *glabrate*, leafy to the inflorescence; leaves pinnatifid and toothed, 1–8 cm. long, 0.5–3 cm. broad; *calyculate bracts* (bracteoles) *of the involucre distinctly black-tipped;* rays none; achenes hirtellous. — Waste grounds, common. July–Sept. (Nat. from Eu.)

2. **S. viscòsus** L. Coarser, 1.5–4 dm. high, *viscid-pubescent* and heavy-scented; leaves pinnatifid with toothed segments or 2-pinnatifid, 2–10 cm. long, 0.5–5 cm. broad; *calyculate bracts* (bracteoles) *of the involucre not black-tipped;* rays minute, bright yellow. — Waste grounds, coast of e. Que. to N. E.; also on ballast near Philadelphia. July–Sept. (Nat. from Eu.)

3. **S. sylváticus** L. Stem erect, 1–7 dm. high, simple or branched, *somewhat pubescent;* lower leaves petioled and more or less lyrate, the upper pinnatifid with unequal lobes, sessile and sagittate at the clasping base, 2–15 cm. long, 1–8 cm. broad; inflorescence corymbose, naked or nearly so; heads cylindrical; *involucre barely calyculate;* ligules but slightly surpassing the disk-flowers. — Clearings and waste places, Nfd. and e. Que. to Me., chiefly near the coast; also near Painesville, O. July–Sept. (Nat. from Eu.)

4. **S. palústris** (L.) Hook. Annual or biennial, loosely villous to nearly glabrous; *stem stout*, 2–7 dm. high; *leaves* oblong-lanceolate, *irregularly toothed or laciniate*, the upper with a heart-shaped clasping base; *rays* 20 *or more, short*, pale yellow; pappus copious and becoming very long. — Wet grounds, Ia. to n. Wisc., N. Dak., and northw. June–Sept. (Eu.)

5. **S. glabéllus** Poir. (Butter-weed.) Rather tall, 2–5 dm. or more high; *leaves* somewhat fleshy, *lyrate or pinnately divided;* divisions crenate or cut-lobed, variable; heads less than 1 cm. high, in a naked corymbose inflorescence; *rays* 6–12, *conspicuous.* (*S. lobatus* Pers.) — Wet grounds, N. C. to centr. Ill., Mo., and southw. March–June.

6. **S. Jacobaèa** L. (Stinking Willie.) Arachnoid-tomentulose to nearly glabrous; stem erect, 2–6 dm. or more high; basal *leaves* somewhat lyrate; those *of the stem* 2–3-*pinnatisect*, sessile, 2–15 cm. long, 1–7 cm. broad; inflorescence a many-headed corymbose cyme; heads radiate. — Roadsides, pastures, and ballast, Nfd. and e. Que. to Me., and locally to Ont. and N. J. July–Aug. (Nat. from Eu.)

7. **S. discoídeus** (Hook.) Britton. Stems erect, 2–8 dm. high, striate; *lower leaves broadly ovate*, 1.5–8 cm. long, 1–4.5 cm. broad, *rounded or obtuse* at the apex, crenate to coarsely dentate, *abruptly contracted into a slightly winged petiole* equaling or exceeding the blade; inflorescence subumbellate; *heads* on rather long peduncles, *discoid;* involucre sparingly calyculate; bracts of the involucre slightly shorter than the flowers of the disk, often purplish-tipped; achenes glabrous. — Calcareous ledges, or in damp thickets, e. Que., n. Mich., northw. and westw. June–Aug.

8. **S. obovàtus** Muhl. Stem 3–6 dm. high, *bearing flagelliform stolons at base; lower leaves obovate*, 1–10 cm. long, two thirds as broad, *gradually narrowed into a narrowly winged petiole*, crenate-dentate, glabrous on both surfaces; upper stem-leaves pinnatifid, sessile; inflorescence a corymbose cyme, not infrequently umbellate; heads radiate; achenes glabrous. (*S. aureus*, var. T. & G.) — Calcareous ledges and open woods, e. Mass. and s. Vt. to N. C., Ala., Ark., and Kan. Apr.–Aug.

Var. **rotúndus** Britton. Lower leaves more or less orbicular or rotund, otherwise like the species. — On moist banks and rocks, centr. O., and southwestw.

Var. **elongàtus** (Pursh) Britton. Habit and foliage of the typical form, but with *elongated peduncles* and *discoid heads*. — Near Easton, Pa. May, June.

9. **S. aúreus** L. (Golden R.) Stems erect from rather slender rootstocks, 3–8 dm. high, at first often lightly floccose-tomentose, soon glabrate; *lower leaves long-petioled, ovate-rotund to slightly oblong*, 1.5–8 cm. long, two thirds as broad, crenate-dentate; stem-leaves lyrate to laciniate-pinnatifid; the uppermost sessile, amplexicaul, often bract-like; inflorescence cymose-corymbose; heads radiate; rays yellow; achenes glabrous. — In wet meadows, moist thickets, and swamps, Nfd., s. to Va., w. to Wisc., Mo., and Ark. May–Aug.

Var. **grácilis** (Pursh) Britton. Somewhat more slender, with lower stems, smaller leaves, and fewer heads. — Pa. and Mich. May, June.

10. **S. Robbínsii** Oakes. *Stems* strict, 5–8 *dm. high;* the first leaves small, ovate-rotund to ovate-oblong, 1–3 cm. long, from two thirds to nearly or quite as broad, crenate-dentate to rather sharply toothed; *the later radical and lower cauline leaves lanceolate to slightly oblong-lanceolate*, 3–10 cm. long, 1.5–3 cm. broad, *sharply and somewhat unequally dentate-serrate;* the uppermost leaves much reduced; inflorescence cymose-corymbose; achenes pubescent. — In wet meadows or swamps, N. B. and N. S. to n. N.Y. June, July.

11. **S. Balsámitae** Muhl. *Stems* 1.5–3 *dm. high*, slightly woolly or floccose-tomentose at the base, *nearly or quite glabrous above; lower leaves mostly oblong-oblanceolate* (rarely oblong-elliptic), 1–5 cm. long, 0.5–1.5 (rarely 3) cm. broad, gradually narrowed at the base into the petiole, *crenate-dentate to rather sharply dentate-serrate*, often pubescent in the early stages and glabrate, or glabrous from the beginning; petioles usually not much exceeding the blade; the upper leaves lyrate, pinnatifid, or much reduced and entire; achenes glabrous or pubescent. (*S. aureus*, var. T. & G.) — Gaspé Co., Que., to Md., Tenn., Ill., and Mich., thence northwestw. essentially across the continent. May–Aug. — A variable species. In shaded alluvium passing into forms essentially glabrous, with more pronounced foliar development. Var. paupérculus (Michx.) Fernald. Smaller, sometimes not over 3 cm. in height, and with the inflorescence not infrequently reduced to a single head. — In cool or much exposed situations, Me., and northw. July–Aug.

Var. **praelóngus** Greenman. Taller; lower leaves long-petioled; stem-leaves rather large, often 1 dm. in length, 2 cm. in breadth, pinnatifid with remote lateral lobes and deep rounded sinuses; achenes hirtellous-pubescent. — Rocky woods and banks, Mass., Vt., and N. Y. June, July.

Var. **Crawfórdii** (Britton) Greenman. Lower leaves slender-petioled; the blade oblong-elliptic, 2–6 cm. long, 1–3 cm. broad, mostly rather sharply serrate-dentate; petioles 1.5 dm. or less in length; involucral bracts 7–8 mm. long. (*S. Crawfordii* Britton.) — Near Philadelphia (*Crawford*). May.

12. **S. Smállii** Britton. Stem tall, erect, 2.5–7 dm. high, simple to the inflorescence, *densely and persistently woolly at the base; lower leaves lanceolate or oblanceolate*, 2.5 dm. or less in length, 1–2 cm. broad, crenate-dentate to

rather sharply serrate; upper stem-leaves sessile, pinnatifid with remotish segments and rounded sinuses; inflorescence cymose-corymbose, many-headed; *heads* radiate, 6–8 *cm. high during anthesis;* achenes usually hispidulous along the angles. — Va., and southw. May, June.

13. **S. platténsis** Nutt. Stems one to several, simple or branched from the base, 1.5–6 dm. high; *lower leaves* petiolate, *ovate to oblong-lanceolate*, 5–10 cm. long, 1–2.5 cm. broad, *crenate-dentate to deeply and irregularly pinnatifid, thickish and as well as the stem usually white-tomentose*, more or less glabrate; inflorescence a corymbose cyme; *heads about* 1 *cm. high*, radiate; achenes commonly hispidulous. — Dry, sandy, or gravelly soil, s. w. Ont. to e. Mont. and Tex. Apr.–July.

14. **S. tomentòsus** Michx. (Woolly R.) *Clothed with scarcely deciduous hoary wool;* stems 3–6 dm. high; *basal leaves oblong*, 2–15 cm. long, 1–7 cm. broad, obtuse, *crenate or entire*, often on elongated stout petioles, 2.5 dm. or less in length; *the stem-leaves similar, lyrate-pinnatifid to entire;* inflorescence cymose-corymbose; heads radiate; rays 12–15. — N. J. to Fla. and Tex. Apr.–June.

15. **S. antennariifòlius** Britton. Stem erect, 3–4 dm. high; *leaves mostly basal, oblong-obovate to spatulate*, including the petiole 3–6 cm. long, 0.5–1.5 cm. broad, rounded or obtuse at the apex, *somewhat remotely and shallowly angulate-dentate*, narrowed below into the petiole, finely and densely matted-tomentose beneath, *loosely floccose-tomentose above;* stem-leaves sublyrate or merely dentate, the uppermost reduced to linear entire bracts; inflorescence cymose-corymbose, few-headed; heads radiate; achenes papillose-hirsute along the angles. — Blue Ridge, Va. June.

16. **S. cànus** Hook. Usually low, 1.5–3.5 dm. high, *persistently tomentose, rarely at all glabrate;* lower leaves oblong-oblanceolate or subspatulate, including the petiole 5–10 cm. long, 1–2 cm. broad, obtuse or rounded at the apex, entire or sparingly toothed, white-tomentose on both surfaces, rarely glabrate above; stem-leaves entire or slightly pinnatifid, the uppermost becoming sessile and not infrequently clasping the stem by a sub-auriculate base; inflorescence few-headed; heads 10–12 mm. high, radiate; involucre arachnoid-tomentose to nearly glabrous, sparingly calyculate; ray-flowers commonly 8; disk-flowers numerous. — Sask., Alb., and along the Rocky Mts. to Col., eastw. to n. Minn. (according to Upham). June–Aug.

17. **S. integérrimus** Nutt. *Covered when young with long jointed crisp-hirsute or subvillous hairs*, soon more or less glabrate; lower leaves oblong-lanceolate or suboblong, including the narrowly winged petiole usually 1–2 dm. long, 1–4 cm. broad, entire or denticulate; the upper bract-like, attenuate from a broad subclasping base; inflorescence few-headed; *heads* 10–12 *mm. high;* involucral bracts usually green-tipped. — Sask., Man., Dak., Ia., and westw. May–July.

18. **S. Pseùdo-Árnica** Less. *Loosely white-woolly*, sometimes becoming glabrous; *stem stout*, 0.5–10 dm. high, leafy above, often nearly naked below; leaves oblong-lanceolate to subovate, 0.5–1.5 dm. long, 1–5 cm. broad, repand-dentate to subentire, the lower tapering into a narrow petiole-like base, the upper sessile; *heads* 1.5–2 *cm. high;* rays 20 or more, yellow. — Gravelly beaches, e. Me. to Lab.; and in the Alaskan region.

80. ÁRCTIUM L. Burdock

Heads many-flowered; flowers all tubular, perfect, similar. Involucre globular; the imbricated bracts coriaceous and appressed at base, attenuate to long stiff points with hooked tips. Receptacle bristly. Achenes oblong, flattened, wrinkled transversely; pappus short, of numerous rough bristles, separate and deciduous. — Coarse biennial weeds, with large unarmed petioled roundish or ovate mostly cordate leaves floccose-tomentose beneath, and small solitary or clustered heads; flowers purple, rarely white. (Name probably from ἄρκτος, *a bear*, from the rough involucre.)

1. **A. Láppa** L. (Great B.) *Heads subcorymbose*, 3–5 *cm. broad;* invo-

lucre glabrous; *bracts straightish*, lance- to linear-attenuate. (*A. Lappa*, var. *majus* Gray; *A. majus* Bernh.) — Roadsides and waste places, N. B., N. E., and probably westw. (Nat. from Eu.)

2. **A.** MÌNUS Bernh. (COMMON B.) *Heads racemose or subracemose*, 1.5–3 *cm. broad;* involucre glabrous or arachnoid; *bracts shorter, more slender and more arcuate than in the preceding.* (*A. Lappa*, var. Gray.) — Similar situations, too common throughout our range except on the northeastern borders where largely replaced by the preceding. — Including *A. Lappa*, var. *tomentosum* Gray, a form differing only in its more or less arachnoid involucre, and apparently less marked or characteristic than the European *A. tomentosum* Mill. (Nat. from Eu.)

81. ÉCHINOPS L. GLOBE THISTLE

Heads 1-flowered, many, aggregated in dense globular capitate clusters, the common involucre of small reflexed bracts. Proper involucres cylindrical, of several series of unequal imbricated spinescent paleaceous bracts; corollas with slender tube and cylindric 5-parted limb. Filaments glabrous. Achenes cylindrical or somewhat tetragonal; pappus coroniform or of many short distinct or connate subpaleaceous bristles. — Stately thistle-like herbs, with alternate spinose pinnatifid or dentate leaves, and large globose terminal (compound) heads of whitish or bluish flowers. (Name from ἐχῖνος, *hedgehog*, and ὄψις, *appearance*, from the bristly nature of the armed foliage or perhaps of the spreading individual heads in the dense spherical glomerules.)

1. **E.** SPHAEROCÉPHALUS L. Tall, 1–2 m. high, grayish- or white-arachnoid on the stem and lower surface of leaves. — Frequent in cultivation and not rare as an escape upon waste-heaps, etc. (Introd. from Eu.)

82. CÁRDUUS [Tourn.] L. PLUMELESS THISTLE

Bristles of the pappus naked (not plumose), merely rough or denticulate. — Leaves conspicuously decurrent, spiny; wings of stem spiny. Otherwise as in *Cirsium*. (The ancient Latin name.)

* *Heads large, nodding, solitary on long nearly naked peduncles; involucre 3–4 cm. in diameter.*

1. **C.** NÙTANS L. (MUSK THISTLE.) Biennial; heads solitary, hemispherical, 3–5 cm. broad; bracts lanceolate, the outer reflexed; flowers purple. — Fields near Harrisburg, Pa.; also pastures, waste places, and ballast, n. to N. B. and Que. June–Oct. (Nat. from Eu.)

* * *Heads smaller, chiefly clustered at the ends of winged branches; involucre 1–2.5 cm. in diameter.*

2. **C.** ACANTHOÌDES L. Annual or biennial; *involucre hemispherical*, 1.5–2.5 *cm. broad; bracts* linear, the *outer somewhat herbaceous and spreading;* flowers rose-purple; corollas about 18 mm. long. — Waste places and ballast, N. S. to N. J. June–Aug. (Adv. from Eu.)

3. **C.** CRÍSPUS L. Annual or biennial; heads mostly clustered and sessile or nearly so; *involucre ovoid*, 1–1.3 *cm. broad; bracts* linear-attenuate, *the outer rather rigid, hardly spreading;* flowers purple or white; corollas about 14 mm. long. — Roadsides, Sydney, Cape Breton; Philadelphia, Pa.; and St. Louis, Mo. Aug.-Sept. (Adv. from Eu.)

83. CÍRSIUM [Tourn.] Hill. COMMON OR PLUMED THISTLE

Heads many-flowered; flowers all tubular, perfect and similar, rarely imperfectly dioecious. Bracts of the ovoid or spherical involucre imbricated in many rows, tipped with a point or prickle. Receptacle thickly clothed with soft bristles or hairs. Achenes oblong, flattish, not ribbed; pappus of numerous bristles united into a ring at the base, plumose to the middle, deciduous. —

Herbs, mostly biennial; the sessile alternate leaves often pinnatifid, prickly. Heads usually large, terminal. Flowers reddish-purple, rarely white or yellowish; in summer. (Name from κιρσός, *a swelled vein*, for which the Thistle was a reputed remedy.) CNICUS of many auth., not L. By some recent Am. auth. included in CARDUUS.

* *Bracts of the involucre all tipped with spreading prickles.*

1. **C. lanceolàtum** (L.) Hill. (COMMON OR BULL THISTLE.) Leaves decurrent on the stem, forming prickly lobed wings, pinnatifid, rough and bristly above, woolly with deciduous webby hairs beneath, prickly; flowers purple. (*Carduus* L.; *Cnicus* Willd.) — Pastures and roadsides. July–Nov. (Nat. from Eu.)

* * *Heads leafy-bracteate at base* (see also no. 11); *proper bracts not prickly.*

2. **C. spinosíssimum** (Walt.) Scop. (YELLOW THISTLE.) Stout, 0.3–1.5 m. high, webby-haired when young; leaves partly clasping, green, soon smooth, lanceolate, pinnatifid, the short toothed and cut lobes very spiny with yellowish prickles; heads 4–8 cm. broad, surrounded by very prickly bract-like leaves, which usually equal the narrow involucral bracts; flowers pale yellow or purple. (*Carduus* Walt.; *Cnicus horridulus* Pursh.) — Sandy soil, Me. to Va., and southw., near the coast; reported from L. Superior. June–Aug.

* * * *Bracts appressed, the inner not at all prickly.*

+ *Leaves white-woolly beneath, and sometimes also above; outer bracts successively shorter, spinose-tipped.*

++ *Leaves white above.*

= *Leaves pinnate, with linear mostly entire divisions.*

3. **C. Pitchèri** (Torr.) T. & G. *White-woolly throughout*, low; stem very leafy; *leaves all pinnately parted into rigid narrowly linear and elongated sometimes again pinnatifid divisions*, with revolute margins; *inner involucral bracts acuminate, generally to a weak prickle;* flowers cream-color. (*Cnicus* Torr.; *Carduus* Porter.) — Sandy shores of Lakes Michigan, Huron, and Superior. July, Aug.

= = *Leaves pinnatifid or pinnately parted, the lobes lanceolate or triangular.*

4. **C. undulàtum** (Nutt.) Spreng. Resembling the preceding; *root biennial*, *leaves* partly clasping, undivided, *undulate-pinnatifid*, or rarely pinnately parted, moderately prickly; involucre 2–3 cm. high; bracts with a definite glandular ridge on the back, and twice or thrice as long as the slender spreading prickle; flowers reddish-purple. (*Carduus* Nutt.; *Cnicus* Gray.) — Islands of L. Huron to Mich., Ia., Kan., and westw. June–Oct. Var. MEGACÉPHALUM (Gray) Fernald. Heads larger; involucre 3–4.5 cm. high. — Minn. to Okla., Tex., and westw.

5. **C. canéscens** Nutt. *Deep-rooted perennial;* leaves narrower and more deeply pinnatifid than in no. 4; involucre 2–2.5 cm. high, its narrow bracts ending in very slender spines. — Minn. and w. Ia., westw. and southwestw.

++ ++ *Leaves green above.*

= *Stems leafy up to the heads.*

a. Leaves deeply pinnatifid into linear-lanceolate lobes.

6. **C. díscolor** (Muhl.) Spreng. Branching *perennial*, 1–2 m. high; stem strongly furrowed, hirsutulous; *basal leaves* 3–4 dm. long, *deeply pinnatifid*, the lobes often cleft; *upper leaves with somewhat falcate lobes*, white-woolly beneath; heads mostly solitary at the tips of the branches; involucre 2.5–3 cm. high; *bracts appressed;* the outer tipped by a weak recurved prickle; *the inner linear- or lance-attenuate, with a very long colorless entire appendage.* (*Carduus* Nutt.; *Cnicus altissimus*, var. Gray.) — Rich soil, N. B. to Ont., Minn., and southw.

b. Leaves entire or sparingly sinuate-lobed (only the basal sometimes deeply pinnatifid.)

7. **C. altíssimum** (L.) Spreng. *Biennial;* stem downy, branching, 1–3.8 m high; *leaves* roughish-hairy above, whitened with close wool beneath, *oblong-ovate to narrowly lanceolate, undivided, sinuate-toothed, or undulate-pinnatifid,* the lobes or teeth with weak prickles; *involucre 2–3 cm. high;* outer *bracts with a short dark glandular line on the back,* abruptly tipped by a spreading setiform prickle; *inner with a lanceolate or deltoid usually serrulate tip;* flowers chiefly purple. (*Carduus* L.; *Cnicus* Willd.) — Fields and copses, Mass. to Minn., Neb., and southw.

8. **C. iowénse** (Pammel) Fernald. Similar, but with larger heads; *involucre 3–3.5 cm. high; bracts with broad long dark glandular back; the inner with a* prolonged *linear- or lance-attenuate* colorless *tip.* — Ia., S. Dak., and Kan.

= = Heads on naked peduncles.

9. **C. virginiànum** (L.) Michx. Stem woolly, slender, simple or sparingly branched, 0.3–1 m. high, the *branches or long peduncles naked; leaves lanceolate,* green above, whitened with close wool beneath, ciliate with prickly bristles, *entire or sparingly sinuate-lobed,* sometimes the lower deeply sinuate-pinnatifid; heads small; outer bracts scarcely prickly; flowers purple. (*Carduus* L.; *Cnicus* Pursh.) — Woods and plains, Va., O., and southw.

+ + Leaves green both sides, or only with loose cobwebby hairs underneath; heads large; bracts scarcely prickly-pointed.

10. **C. mùticum** Michx. (Swamp Thistle.) *Stem tall,* 1–2.5 m. high, angled, smoothish, panicled at the summit; branches sparingly leafy, bearing single or few rather large heads; *leaves* somewhat hairy above, whitened *with loose webby hairs beneath* when young, *deeply pinnatifid, the divisions lanceolate,* acute, cut-lobed, prickly-pointed; *bracts of the webby and glutinous* (sometimes glabrate) *involucre* closely appressed, *pointless* or barely mucronate; flowers purple. (*Carduus* Pers; *Cnicus* Pursh.) — Swamps and low woods, common, July–Sept. Var. subpinnatifidum (Britton) Fernald. Leaves slightly lobed, not deeply pinnatifid. (*Carduus muticus,* var. Britton.) — Nfd. to W. Va.

11. **C. pùmilum** (Nutt.) Spreng. (Pasture or Bull Thistle.) *Biennial; stem low* and stout, 3–9 dm. high, hairy, bearing very large *heads* (4–8 cm. broad), which are often *leafy-bracted* at the base; *leaves green,* lanceolate-oblong, partly clasping, *somewhat hairy, pinnatifid, with short and cut very prickly-margined lobes; outer bracts prickly-pointed,* rarely a little glutinous on the backs, the inner very slender; flowers purple or rarely white, fragrant, 5 cm. long; *anthers scarcely acuminate; roots terete, solid.* (*Cnicus odoratus* Muhl., *nomen subnudum; Carduus odoratus* Porter.) — Dry fields, N. E. to Pa. and Del. July–Sept.

12. **C. Híllii** (Canby) Fernald. Similar to the preceding, *perennial,* rarely with more than 1 head; leaves less deeply and more bluntly pinnatifid, with finer and shorter prickles; *bracts with a conspicuous dark glutinous line down the back; anthers acuminate;* perpendicular *root fusiform, hollow.* (*Cnicus* Canby; *Carduus* Porter.) — Fields, Ont. to Minn., s. to Pa., Ill., and Ia.

** * * * Outer bracts of the appressed involucre barely prickly-pointed; heads mostly small and numerous.*

+ None of the leaves strongly decurrent.

13. **C. arvénse** (L.) Scop. (Canada Thistle.) Perennial, slender, 3–9 dm. high, the *rootstock extensively creeping; leaves oblong or lanceolate,* smooth, or slightly woolly beneath, finally green both sides, strongly sinuate-pinnatifid, very prickly-margined, *the upper sessile but scarcely decurrent; heads imperfectly dioecious;* flowers rose-purple or whitish. (*Carduus* Robson; *Cnicus* Hoffm.) — Cultivated fields, pastures, and roadsides, common; a most troublesome weed, extremely difficult to eradicate. (Nat. from Eu.) Var. vestìtum Wimm. & Grab. Leaves permanently white-lanate beneath. — Locally established. (Nat. from Eu.) Var. integrifòlium Wimm. & Grab. Leaves

chiefly plane and uncut, or the lowest slightly pinnatifid. — Local, Que., N. E., and N. Y. (Nat. from Eu.)

+ + *At least the lower leaves strongly decurrent.*

14. **C.** PALÚSTRE (L.) Scop. Tall, *not stoloniferous; stem armed throughout by the prickly decurrent wings* which extend down from the very *long linear or linear-lanceolate* more or less pinnatifid spinose-ciliate *leaves; heads* resembling those of no. 13, but *in denser glomerulate clusters, hermaphrodite.* — Thoroughly naturalized in woods, East Andover, N. H. (*G. W. Holt*). (Nat. from Eu.)

15. **C.** CÀNUM (L.) Bieb. *Roots fusiform; lower leaves* very long, lanceolate, toothed or slightly pinnatifid, green on both sides, their bases *decurrent as ciliate wings along the stem; upper leaves sessile; heads* comparatively large, hemispherical, *on long peduncles.* — Established at Kendal Green, Mass. (*Miss Parsons*). (Adv. from Eu.)

84. ONOPÓRDUM [Vaill.] L. Cotton or Scotch Thistle

Receptacle deeply honey-combed, not setose. Pappus not plumose. Otherwise as *Cirsium.* — Coarse branching annuals or biennials, with the stems winged by the decurrent bases of the lobed and toothed somewhat prickly leaves. Heads large; flowers purple. (Latinized from the ancient Greek name of the plant.)

1. **O.** ACÁNTHIUM L. Stem (1–3 m. high) and leaves cotton-woolly; scales linear-awl-shaped. — Roadsides and waste places, N. B. and N. S. to Ont., s. to N. J. and Mich., rather rare. July–Sept. (Nat. from Eu.)

85. SÍLYBUM [Vaill.] Adans. Milk Thistle

Heads many-flowered; flowers all alike, tubular, perfect, fertile. Involucre large, depressed-globose; the bracts large, prickly, the broadly ovate base gradually or rather abruptly contracted to a straightish rigid spreading or reflexed herbaceous but indurated and pungent tip. Receptacle flattish, densely bristly. Achenes glabrous; pappus of numerous flattish barbellate bristles united into a ring at the base and deciduous together. — Thistle-like tall stout prickly herbs with sinuate-lobed or pinnatifid mottled leaves and large solitary heads of purple flowers. (Derived from σίλυβος, the ancient Greek name of an edible-stemmed thistle.)

1. **S.** MARIÀNUM (L.) Gaertn. (Lady's Thistle.) Stout and nearly glabrous annual or biennial, with large mottled amplexicaul leaves variously lobed and prickly on the margin. (*Mariana* Hill.) — An occasional escape from gardens, or weed on ballast and waste grounds. (Introd. from s. Eu.)

86. CENTAÚREA L. Star Thistle

Heads many-flowered; flowers all tubular, the marginal often much larger (as it were radiate) and sterile. Receptacle bristly. Involucre ovoid or globose, imbricated; the bracts margined or appendaged. Achenes obovoid or oblong, compressed or 4-angled, attached obliquely at or near the base; pappus setose or partly chaffy, or none. — Herbs with alternate leaves; the single heads rarely yellow. (Κενταυρίη, an ancient Greek plant-name, poetically associated with Chiron, the *Centaur*, but without wholly satisfactory explanation.)

Bracts of the involucre (or at least the outer ones) terminated by a definite elongate rigid spine; annuals.
- Stems not winged . . . . . 1. *C. Calcitrapa.*
- Stems winged.
  - Spines of the involucre stout, straw-colored, 12–18 mm. long . . . . 2. *C. solstitialis.*
  - Spines of the involucre slender, purplish, 6–9 mm. long . . . . . 3. *C. melitensis.*

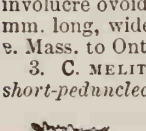
Bracts not spinose-tipped, or merely with short firm tip hardly longer than the lateral teeth, cilia, or fringe.
- Bracts entire or merely with irregularly denticulate or lacerated (not regularly toothed or pectinate) margin . . . . . 4. *C. Jacea.*

Some bracts with regularly pectinate or toothed margin or tip.
- Annual, with floccose white pubescence and simple entire linear or lanceolate leaves . . . . . 5. *C. Cyanus.*
- Biennials or perennials (exceptionally annuals), green; lowest leaves usually pinnatifid or coarsely toothed.
  - Middle and outer bracts pectinate or fringed two thirds to the base.
    - Leaves all pinnatifid; green bodies of the involucral bracts conspicuous, their margins dark . . . . . 6. *C. Scabiosa.*
    - At least the upper leaves entire or merely short-toothed; pale bodies of the involucral bracts mostly hidden by the imbricated appendages.
      - Heads 2–5 cm. broad; involucral bracts with dark appendages . 7. *C. nigra.*
      - Heads 6–12 cm. broad; bracts with pale brown or straw-colored appendages . . . . . 8. *C. americana.*
  - Middle and outer bracts pectinate only at the usually darker tip.
    - Lower leaves pinnatifid into linear or lanceolate segments, the upper mostly linear; involucral bracts distinctly ribbed . . . . 9. *C. maculosa.*
    - Lower leaves elliptic or oblanceolate, lyrate-pinnatifid or coarsely dentate, the upper similar; involucral bracts plane or obscurely ribbed . . . . . 10. *C. vochinensis.*

1. C. CALCÍTRAPA L. (CALTROPS, STAR THISTLE.) Diffusely branched, somewhat pubescent; *leaves spinulose-toothed; heads sessile;* all but the innermost involucral *bracts terminated by a stout divergent straw-colored spine* (1–2.5 *cm. long*), which is naked or with 1 to 4 pairs of spinules at the broad base; *corollas purplish*, all tubular. — Ballast and waste ground, rarely in open woods near towns, N. Y. to Va. June–Oct. (Nat. from Eu.)

2. C. SOLSTITIÀLIS L. (BARNABY'S THISTLE.) Grayish with loose floccose pubescence, branched, 3–5 dm. high; basal leaves deeply pinnatifid; the lobes oblong and elliptical, serrate; cauline leaves small, oblong-lanceolate, entire or nearly so, strongly decurrent in *broadish wings upon the stem;* body of the involucre ovoid, 1.5 cm. in diameter, the stout *straight stramineous spines* 12–18 mm. long, widely spreading or reflexed; *flowers yellow.* — Waste ground, etc., e. Mass. to Ont. and Ia., becoming frequent. (Adv. from Eu.)

3. C. MELITÉNSIS L. *Leaves slightly decurrent; heads subsessile, or mostly short-peduncled, leafy-bracted at base;* middle and lower *bracts terminated by slender weak divergent spinulose-based spines;* innermost bracts with ascending purplish spines; *corollas yellow.* — Ballast and waste grounds about ports; more abundant in the Pacific States. June–Sept. (Nat. from Eu.)



1010. C. Jacea. Involucre and bract × ½.

4. C. JÀCEA L. Simple or branched, 3–6 dm. high; *leaves* lanceolate or oblanceolate, *slightly denticulate*, the lowest petioled, the upper sessile; heads showy; involucre subglobose; outer *bracts* pale; the others *glossy dark brown, entire or slightly lacerated; corollas rose-purple, the marginal conspicuously enlarged and falsely radiate.* — Waste ground and fields, local, N. E., N. Y., and N. J June–Sept. (Nat. from Eu.) FIG. 1010.

Var. LÁCERA Koch. *Leaves often runcinate-dentate; outer and middle bracts of the involucre with a pale finely lacerated fringe.* Mass. to N. J. (Nat. from Eu.) FIG. 1011.

1011. C. Jacea, v. lac. Involucre and bract × ½.

5. C. CYANUS L. (BLUEBOTTLE, BACHELOR'S BUTTON, CORN-FLOWER.) *Slender*, with long ascending branches terminated by solitary heads; *involucre ovoid, of about* 4 *very unequal series of pale bracts; the outermost* narrowly deltoid, *and* with *the longer middle ones bordered by a white or silvery sharp-toothed scarious band;* the innermost elongate-lanceolate, with more or less erose and colored tips; *marginal flowers large and ray-like*, blue, violet, pink, or white. — Escaped from cultivation to roadsides, etc. July–Sept. (Introd. from Eu.)

6. C. SCABIÒSA L. *Plant rather villous*, leafy toward the base, *the solitary large* (5–6 *cm. broad*) *heads on elongated bracted peduncles;* involucre broadly ovoid; the outer *bracts* ovate-triangular, the inner oblong, all *with a conspicuously pectinate-ciliate dark margin; corollas purplish, the marginal falsely radiate.* — Fields and waste places, local, e. Que. to Ont. and O. (Nat. from Eu.)

7. **C. nìgra** L. (Knapweed, Spanish Buttons.) Rather *harsh* somewhat branched *plant, with reduced leaves extending nearly or quite to the heads*, involucre subglobose; the *appendages* of the bracts *hirtellous, blackish* (rarely tawny); *the outermost and middle ones lance-deltoid and very deeply pectinate-ciliate;* the innermost ovate or orbicular, paler and irregularly lacerate; *corollas rose-purple, all tubular.* — Fields and roadsides, locally abundant, Nfd. and Que. to N. J. July–Sept. (Nat. from Eu.) Fig. 1012.

1012. C. nigra. Involucre and bract × ½.

Var. radiàta DC. *Involucre tawny* (rarely blackish); *outer flowers falsely radiate.* — N. S. to Ont. and Pa. (Nat. from Eu.)

8. **C. americàna** Nutt. *Tall* and smoothish (0.5–1.5 m. high); *stems conspicuously thickened below the showy heads; leaves oblong-lanceolate, mostly entire; bracts all with conspicuously fringed scarious appendages, the outermost and middle with spreading*, the elongate *innermost with ascending, teeth;* corollas rose-purple to flesh-pink, the outer conspicuously enlarged. — Plains, Mo., southw. and southwestw. May–Aug.

9. **C. maculòsa** Lam. Pubescent or glabrate, with ascending rather wiry branches; involucre ovoid-campanulate, in fruit becoming open-campanulate; the *outer and middle* ovate *bracts with rather firm points and with 5–7 pairs of cilia at the dark tip;* innermost bracts elongate, entire or lacerate; corollas whitish, rose-pink, or purplish, the marginal falsely radiate. — Waste places, roadsides, etc., N. E. to N. J. (Adv. from Eu.)

10. **C. vochinénsis** Bernh. *Harsh*, somewhat *resembling* no. 7; *involucre of several very unequal series;* the *outermost bracts* deltoid or ovate, *short, the dark pointed tip bearing 5–7 pairs of long cilia; middle bracts* elongate-lanceolate, *terminated by a dilated* ovate or orbicular *dark pectinate appendage;* innermost bracts elongate, with dark or brightly colored erose or lacerate appendage; corollas rose-purple, the marginal falsely radiate. — Fields and roadsides, local, N. E. to Ont. (Nat. from Eu.) Fig. 1013.

1013. C. vochinensis. Involucre and bract × ½.

87. CNÌCUS L. Blessed Thistle

Heads many-flowered; flowers all tubular, the marginal sterile, shorter than the others, which are perfect and fertile. Bracts of the ovoid involucre coriaceous, appressed, extended into a long and rigid spinous appendage. Receptacle clothed with capillary bristles. Achenes terete, short, strongly many-striate, crowned with 10 short and horny teeth and bearing 10 elongated rigid bristles, also 10 shorter alternating ones in an inner row. — An annual somewhat pubescent herb, with scarcely pinnatifid-cut but spinescent leaves and large leafy-bracted heads of yellow flowers. (Latin name of the Safflower, from the Greek κνῆκος.)

1. **C. benedíctus** L. (*Centaurea* L.) — Roadsides and waste places, rare, N. B. and N. S. to Pa., and southw. (Adv. from Eu.)

88. LÁPSANA L. Nipple-wort

Heads 8–12-flowered. Bracts of the cylindrical involucre 8, erect; a short outer series also present. Receptacle naked. Achenes oblong; pappus none. — Slender branching annuals, with angled or toothed leaves, and loosely panicled small heads; flowers yellow. (The λαμψάνη of Dioscorides was evidently a wild Mustard.) Lampsana Hill.

1. **L. commùnis** L. Nearly smooth, 3–8 dm. high; lower leaves ovate, sometimes lyre-shaped. — Roadsides and waste places, Que. to Pa., and Mich. (Nat. from Eu.)

89. SERÍNIA Raf.

Heads as in *Lapsana*, but the involucre not calyculate; tips of the bracts somewhat conniving in fruit. Achenes obovoid, 10-costate, obscurely and transversely scabrous-lineolate. — Low glaucescent glabrous annuals, with oblong to lanceolate entire or repand-dentate leaves, the upper sessile; and small scattered heads on slender peduncles. (Name intended as a diminutive of *σέρις*, *chicory*.) Apogon Ell.

1. S. oppositifòlia (Raf.) Ktze. Peduncles naked or glandular-bristly below the small (0.5 cm. high) heads. — Damp sandy soil, S. C. to Ill., Kan., and southw. March–June.

90. ARNÓSERIS Gaertn.

Heads many-flowered; flowers all ligulate and fertile. Involucre campanulate; bracts narrow, equal, in 1 series, acuminate, after anthesis thickened toward the base. — Small annual, with rosulate leaves and branched upwardly thickened scapes bearing rather small heads of yellow flowers. (Name from *ἀρνός*, *lamb*, and *σέρις*, *chicory*.)

1. A. mínima (L.) Dumort. (Lamb Succory.) Puberulent, 1.5–3 dm. high; leaves oblanceolate or spatulate, mostly toothed. — Fields, etc., Me., O., Mich., and probably elsewhere. (Adv. from Eu.)

91. CICHÒRIUM [Tourn.] L. Succory or Chicory

Heads several-flowered. Involucre double, herbaceous, the inner of 8–10, the outer of 5 short and spreading bracts. Achenes striate; pappus of numerous small chaffy scales, forming a short crown. — Branching perennials, with deep roots; the sessile heads 2 or 3 together, axillary and terminal, or solitary on short thickened branches. Flowers bright blue, varying to purple or pink (rarely white), showy. (Altered from the Arabian name of the plant.)

1. C. Íntybus L. (Common C., Blue Sailors.) Stem-leaves oblong or lanceolate, partly clasping, the lowest runicate, those of the rigid flowering branches minute. (Including var. *divaricatum* of Am. auth., probably not of DC.) — Roadsides and fields, Nfd. to Minn., and southw. July–Oct. (Nat. from Eu.)

92. KRÍGIA Schreb. Dwarf Dandelion

Heads several–many-flowered. Involucral bracts several, in about 2 rows, thin. Achenes short and truncate, top-shaped or columnar, terete or angled; pappus double, the outer of thin pointless chaffy scales, the inner of delicate bristles. — Small herbs, branched from the base; the leaves chiefly radical, lyrate or toothed; the small heads terminating the naked scapes or branches. Flowers yellow. (Named for *David Krieg*, a German physician, who was among the first to collect plants in Maryland.) Adopogon Neck.

§ 1. CÝMBIA T. & G. *Bracts of involucre 5–8, remaining erect; achenes turbinate; pappus of 5 obovate scales, and usually 5 alternating bristles; annual.*

1. K. occidentàlis Nutt. Scapes tufted, 1.5 dm. or less high, glandular-hispid, at least above; leaves obovate to lanceolate, entire, lyrately lobed, or pinnatifid. (*Adopogon* Ktze.) — Prairies, s. Mo. and Kan. to Tex. March–May.

§ 2. EUKRÍGIA T. & G. *Bracts of involucre 9–18, reflexed in age; achenes turbinate, 5-angled; pappus of 5–7 short roundish scales and as many alternating bristles; annual.*

2. K. virgínica (L.) Willd. Scapes several, 3 dm. or less high, becoming branched and leafy; earlier leaves roundish and entire, the others narrower and often pinnatifid. (*Adopogon carolinianum* Britton.) — Dry soil, s. Me. to Ont., Minn., and southw. Apr.–Aug.

§ 3. CÝNTHIA (D. Don) Gray. *Involucre of the preceding section; achenes more slender; pappus of* 10–15 *small oblong scales and* 15–20 *bristles; perennial.*

3. K. **Dandèlion** (L.) Nutt. *Roots* slender, *tuberiferous; scapes leafless,* 1.5–5 dm. high; leaves varying from spatulate-oblong to linear-lanceolate, entire or few-lobed. (*Adopogon* Ktze.) — Moist ground, Md. to Kan., and southw. March–July.

4. K. **amplexicaúlis** Nutt. (CYNTHIA.) *Roots fibrous;* stem 1–6 dm. high; *stem-leaves* 1–3, oblong or oval, *clasping*, mostly entire; the radical ones on short winged petioles, often toothed, rarely pinnatifid; peduncles 2–5. (*Adopogon virginicum* Ktze.) — Moist banks, Mass. to Ont., Man., and southw. May–Aug.

93. HYPOCHAÈRIS L. CAT'S-EAR

Similar to *Leontodon*, but at least the inner achenes produced into long slender beaks. Receptacle chaffy. — Old World and South American herbs, with bracteate slightly branching scapes and yellow flowers. (A name used by Theophrastus for this or a related genus.)

1. H. RADICÀTA L. Perennial; *leaves hirsute;* scapes 2–4 dm. high, *stout;* heads 2.5–4 cm. broad; *achenes all beaked.* — Fields, waste places, and on ballast, Mass. to N. J. and Ont. (*Morton*). (Nat from Eu.)

2. H. GLÀBRA L. *Slender, glabrous*, with smaller heads; *outer achenes truncate.* — Sparingly in grassland in Me. and O.; naturalized in Cal. (Adv. from Eu.)

94. LEÓNTODON L. HAWKBIT

Heads many-flowered. Involucre scarcely imbricated, but with several bractlets at the base. Achenes spindle-shaped, striate, all alike; pappus persistent, composed of plumose bristles which are enlarged and flattened toward the base, with sometimes an outer paleaceous crown. Receptacle not chaffy. — Low and stemless perennials, with toothed or pinnatifid basal leaves, and scapes bearing one or more yellow heads. (Name from λέων, *a lion*, and ὀδούς, *a tooth*, in allusion to the toothed leaves.)

* *Scape simple or branching, scaly-bracteate above; heads before anthesis erect; pappus a single row of plumose bristles.*

1. L. AUTUMNÀLIS L. (FALL DANDELION, "ARNICA.") Leaves laciniate-toothed or pinnatifid, somewhat pubescent; scape commonly forking, 1–6 dm. high; peduncles thickened at summit, scaly-bracteate (rarely leafy), involucre glabrous or slightly pubescent; tawny pappus a row of equal bristles. — Fields and roadsides, Nfd. to w. Ont., Mich., and Pa. Late May–Nov. — A frequent teratological or pathological form has greenish-yellow heads without ligules. (Nat. from Eu.)

Var. PRATÉNSIS (Link) Koch. Usually larger; involucre and tips of peduncles densely soft-pubescent with blackish hairs. — Often more abundant than the typical form. (Nat. from Eu.)

** *Scape simple and naked; heads before anthesis nodding; pappus of two kinds.*

← *Pappus similar in all the flowers, the outer a few short setae, the inner a row of plumose bristles with dilated bases.*

2. L. HASTÌLIS L. Rather stout, glabrous throughout; leaves oblong-lanceolate, dentate or pinnatifid; scape 2–7 dm. high, thickened upward; heads rather large; involucre 11–14 mm. long, its smooth lanceolate bracts lead-colored. — Fields, local, Ct. to O. (Adv. from Eu.)

Var. VULGÀRIS Koch. Leaves, scape, and involucre bristly-hispid. (*L. hispidus* L.) — Fields and waste places, R. I. to Ont. and s. N. Y. (Adv. from Eu.)

+ + *Pappus of the marginal flowers a crown of short scales, of the inner flowers setiform and plumose.*

3. L. NUDICAÚLIS (L.) Banks. Slender; leaves hispid; scape filiform, 1–2 dm. high; involucre 7–10 mm. long, its lanceolate bracts hirsute or glabrous. (*L. hirtus* L.) — Locally established in pastures and waste places, Ct. to N. J (Adv. from Eu.)

95. PÌCRIS L.

Heads many-flowered, terminating leafy stems. Outer bracts loose or spreading. Achenes with 5–10 rugose ribs; pappus of 1 or 2 rows of plumose bristles. — Coarse rough-bristly annuals or biennials, with yellow flowers. (The Greek name of some allied bitter herb, from πικρός, *bitter.*)

1. P. HIERACIOÌDES L. Rather tall, corymbosely branched, the bristles somewhat barbed at tip; *leaves* lanceolate or broader, clasping, *irregularly toothed; outer* involucral *bracts narrow;* achenes oblong, with little or no beak; *pappus sparsely plumose.* — Waste places, sparingly in the interior, and in ballast on the coast. June–Oct. (Adv. from Eu.)

2. P. ECHIOÌDES L. (OX-TONGUE.) Similar, but *leaves and bracts spinescent; the outer bracts ovate, subcordate*, the narrow inner ones becoming thickened below; achenes beaked; *pappus densely plumose.* — Similar situations. July–Sept. (Adv. from Eu.)

96. TRAGOPÒGON [Tourn.] L. GOAT'S BEARD

Heads many-flowered. Involucre simple, of several erect lanceolate attenuate equal bracts. Achenes narrowly fusiform, 5–10-ribbed, long-beaked; pappus of numerous long plumose bristles. — Stout glabrous biennials or perennials, with entire grass-like clasping leaves and large solitary heads of yellow or purple flowers. (Name from τράγος, *goat*, and πώγων, *beard.*)

1. T. PORRIFÒLIUS L. (SALSIFY, OYSTER-PLANT.) Stem 1 m. or less high; peduncle thickened and fistulous below the head; *flowers purple;* achenes and pappus 7–8 cm. long. — Sparingly escaped from cultivation. (Introd. from Eu.)

2. T. PRATÉNSIS L. (GOAT'S BEARD.) Very similar; leaves somewhat broader at base; peduncle little thickened; *flowers yellow.* — Fields, rocky banks, etc., N. B. and N. S. to N. J., and westw. (Nat. from Eu.)

97. CHONDRÍLLA [Tourn.] L. GUM SUCCORY

Heads few-flowered. Involucre cylindrical, of several narrow linear equal bracts and a row of small bractlets at base. Achenes terete, several-ribbed, smooth below, roughened at the summit by little scaly projections, from among which springs an abrupt slender beak; pappus copious, of very fine and soft capillary bristles, bright white. — Herbs of the Old World, with wand-like branching stems, and small heads of yellow flowers. (A name used by Dioscorides for some plant which exudes a gum.)

1. C. JÚNCEA L. (SKELETON-WEED.) Biennial, bristly-hairy below, smooth above, 1 m. or less high; root-leaves runcinate; stem-leaves few and small, linear; heads scattered on nearly leafless branches, 1–1.5 cm. long. — Fields and roadsides, abundant in Md. and n. Va. July, Aug. (Nat. from Eu.)

98. TARÁXACUM [Haller] Ludwig. DANDELION

Heads many-flowered, large, solitary on a slender hollow scape. Involucre double, the outer of short bracts; the inner of long linear bracts, erect in a single row. Achenes oblong-ovate to fusiform, 4–5-ribbed, the ribs roughened; the apex prolonged into a very slender beak, bearing the copious soft white capillary pappus. — Perennials or biennials; leaves radical, pinnatifid or runci-

1014. T. officinale.
Heads and leaf-tips × ⅔.

nate; flowers yellow. (Name from ταράσσειν, *to disquiet* or *disorder*, in allusion to medicinal properties.)

1. T. OFFICINÀLE Weber. (COMMON D.) *Leaves coarsely pinnatifid*, sinuate-dentate, rarely subentire; *heads large* (3–5 *cm. broad*), *orange-yellow;* involucral *bracts not glaucous; the outer elongated, conspicuously reflexed; achene olive-green or brownish*, bluntly muricate above, its beak 2–3-times its length; *pappus white.* (*T. Dens-leonis* Desf.; *T. Taraxacum* Karst.) — Pastures and fields, very common. Apr.–Sept. (and rarely throughout autumn and winter). — After blossoming, the inner involucre closes, and the slender beak elongates and raises up the pappus while the fruit is forming; the whole involucre is then reflexed, exposing to the wind the naked fruits, with the pappus in an open globular head. (Nat. from Eu.) FIG. 1014.

1015. T. off. v. pal.
Closed head × ⅔.

Var. PALÚSTRE (Sm.) Blytt. Outer bracts lanceolate to deltoid-ovate, ascending or spreading. — In damp places, e. Que. to Ct. (Nat. from Eu.) FIG. 1015.

1016. T. erythrospermum.
Heads and leaf-tip × ⅔.

2. T. ERYTHROSPÉRMUM Andrz. (RED-SEEDED D.) *Leaves deeply runcinate-pinnatifid* or pinnately divided into narrow segments; *heads smaller* (2–3 *cm. broad*), *sulphur-yellow*, outer ligules purplish without; *involucre glaucous*, the *inner bracts corniculate-appendaged at tip;* the *outer short, lanceolate, spreading or ascending; achene* smaller, *bright red or red-brown*, sharply muricate above, more than half as long as the beak; *pappus sordid-white.* — In dry fields and on rocks, Me. to Pa., locally w. to Kan. Late Apr.–June. (Nat. from Eu.) FIG. 1016.

99. SÓNCHUS [Tourn.] L. SOW THISTLE

Heads many-flowered, becoming tumid at base. Involucre more or less imbricated. Achenes obcompressed, ribbed or striate, not beaked; pappus copious, of very white exceedingly soft and fine bristles mainly falling together. — Leafy-stemmed coarse weeds, chiefly smooth and glaucous, with corymbed or umbellate heads of yellow flowers produced in summer and autumn. (The ancient Greek name.)

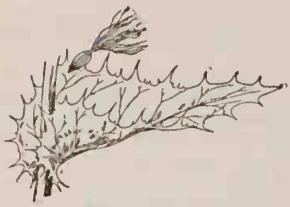
* *Perennial, with creeping rootstocks; flowers bright yellow, in large heads.*

1. S. ARVÉNSIS L. (FIELD S.) Leaves runcinate-pinnatifid, spiny-toothed, clasping by a heart-shaped base; peduncles and involucre bristly; achenes transversely wrinkled on the ribs. — Roadsides, fields, and gravelly shores, Nfd. and N. S. to N. J., w. to the Rocky Mts., commonest northw. (Nat. from Eu.)

1017. S. oleraceus.
Leaf × ½. Achene × 1⅓.

** *Annual; flowers pale yellow.*

2. S. OLERÀCEUS L. (COMMON S.) Stem-leaves runcinate-pinnatifid, or rarely undivided, slightly toothed with soft spiny teeth, clasping by a heart



1018. S. asper.
Leaf × ½. Achene × 1⅓.

shaped base, the auricles acute; involucre downy when young; *achenes* striate, also *wrinkled transversely.* — Waste places, chiefly in manured soil and around dwellings. (Nat. from Eu.) Fig. 1017.

3. S. Asper (L.) Hill. (Spiny-leaved S.) Stem-leaves less divided and more spiny-toothed, the auricles of the clasping base rounded; *achenes* margined, 3-nerved on each side, *smooth.* — Waste places, roadsides, etc. (Nat. from Eu.) Fig. 1018.

100. LACTÙCA [Tourn.] L. Lettuce

Heads several-many-flowered. Involucre cylindrical or in fruit conical; bracts imbricated in 2 or more sets of unequal lengths. Achenes contracted into a beak, which is dilated at the apex, bearing a copious and fugacious very soft capillary pappus, its bristles falling separately. — Leafy-stemmed herbs, with panicled heads; flowers of variable color, produced in summer and autumn. (The ancient name of the Lettuce, *L. sativa* L.; from *lac*, milk, in allusion to the milky juice.)

N. B. — In this genus, the figures of the fruiting heads are on a scale of ⅔, of the achene 1⅓.

§ 1. SCARÌOLA DC. *Achenes very flat, orbicular to oblong, with a distinct soft filiform beak; pappus white; biennial or annual; cauline leaves sagittate-clasping.*

* *Heads small, 6–12-flowered; achenes from linear-oblong to obovate-oblong, several-nerved, about equaling the beak; introduced species.*

1. L. scarìola L. (Prickly L.) Stem below sparsely prickly-bristly; *leaves pinnatifid, spinulose-denticulate*, tending to turn into a vertical position (*i.e.* with one edge up); midrib usually setose beneath; panicle loose, with widely spreading branches; flowers pale yellow, sometimes turning bluish in fading or drying. — Roadsides, railway ballast, etc., s. N. E. to O., Mo., and Ky., chiefly westw., but even there less common than the following variety. (Adv. from Eu.)

Var. integràta Gren. & Godr. *Leaves oblong, denticulate*, none of them or only the lowest pinnatifid; midrib prickly-setose or rarely smoothish. (*L. virosa* of Am. auth., not L.) — Waste grounds and roadsides, across the continent; westw. an abundant and pernicious weed. (Nat. from Eu.)

2. L. salígna L. Much more slender than the preceding species; stem nearly or quite smooth; *leaves linear-oblong or narrow and runcinately pinnatifid* (the winged rhachis only 3–5 mm. wide), the margin sparingly toothed, *not* regularly or conspicuously *denticulate;* heads short-pediceled, in virgate somewhat fastigiate panicles. — Waste ground, O. (*Selby, Kellerman*). (Adv. from Eu.)

** *Heads 12–20-flowered; achenes oval to oblong-oval, blackish, narrow-margined, about equaling the beak, 1-nerved on each face.*

← *Leaves glabrous.*

3. L. canadénsis L. (Wild L., Horse-weed.) Mostly tall (1–3.2 m. high), very leafy, glabrous or nearly so, glaucous; *leaves* 1.5–3 dm. long, pale beneath, mostly *sinuate-pinnatifid*, the upper lanceolate and entire; heads 1–1.5 cm. long, numerous, in an elongated usually open panicle; flowers pale yellow. — Rich damp soil, borders of fields or thickets, common. Fig. 1019. Var. montàna Britton. *Leaves* all *entire*, rather *narrowly oblong-lanceolate.* — Shores, clearings, and rocky uplands, N. S. to Ont. and O. — A similar state is often developed when the main axis is injured as by mowing.

1019. L. canadensis.

4. L. integrifòlia Bigel. Similar in stature, inflorescence,

etc.; *leaves broadly oblanceolate* or even obovate, *unlobed*, pale beneath, acuminate, sagittate at base, some or all rather *finely sinuate-toothed*, the upper usually entire or nearly so. — Rich thickets, etc., e. Mass. to Ind.

5. **L. sagittifòlia** Ell. Tall and stout, glabrous, very leafy; *leaves* thickish, *broadly oblong* or lance-oblong, acute, *strictly entire* or merely a little toothed on the broad and conspicuous amplexicaul auricles of the sagittate base; inflorescence, etc., as in nos. 3 and 4. (*L. integrifolia* Man. ed. 6, in part.) — Rich soil, Pa. to S. C.

← ← *Leaves hirsute or hispid-setose on the midnerve beneath.*

↔ *Stem leafy chiefly at or below the middle; bracts of the inflorescence minute, subulate; slender eastern and southern species.*

1020. L. hirsuta.

6. **L. hirsùta** Muhl. Rather few-leaved, 0.5–1 m. high, commonly hirsute at base; leaves hirsute on both sides or only on the midrib, mostly runcinate-pinnatifid, with rather narrow rhachis and lobes; heads slender and elongated, in a loose open panicle; achenes elliptic-oblong, equaled by the beak; flowers yellow-purple, rarely whitish. — Dry open ground, Que. to La. and Tex. Fig. 1020.

↔ ↔ *Stem more uniformly leafy; bracts at the base of the inflorescence somewhat foliaceous; stout species of the interior.*

1021. L. ludoviciana.

7. **L. ludoviciàna** (Nutt.) Riddell. Tall and stout, 0.5–1.5 m. high, leafy; leaves sinuate-pinnatifid, the rhachis and spinulose-toothed lobes rather broad; heads large, ovoid, in an open panicle; the involucre much imbricated, 1.5–2 cm. long; *flowers yellow.* — Minn., Ia., and southwestw. Fig. 1021.

8. **L. campéstris** Greene. Closely similar to no. 7, but *flowers blue.* — Prairies, s. Minn. to Kan. — Perhaps only a color form of the preceding.

* * * *Heads about 18-flowered; achenes lanceolate, 3-ribbed on each face, narrow-margined, 3–4 times exceeding the beak.*

9. **L. Mórssii** Robinson. Very leafy, somewhat hirsute below, 1–3 m. high; leaves runcinate-pinnatifid, mostly 5-lobed, 1.2–2 dm. long, half as broad, on broadly winged clasping petioles, the lower somewhat hirsute beneath on the midrib, etc.; panicle ample; involucre about 1 cm. long; flowers blue; achene black, mottled with brown; pappus cream-colored in drying. — Rich low ground, Me. and Mass.; also reported from n. N. Y. Fig. 1022.

1022. L. Morssii.

§ 2. LACTUCÁSTRUM Gray. *Achenes flat, lanceolate-oblong, marginless, tapering to a short slender firm beak; perennial; flowers blue.*

10. **L. Steèlei** Britton. Tall and stout; *leaves ovate-oblong* to broadly lanceolate, *doubly dentate* but unlobed, acuminate, *hirsute* upon the midnerve and principal veins *beneath*, narrowed at the base to rather long and winged petioles; heads in an open panicle; flowers bluish-purple; achenes lanceolate, 3-ribbed on each surface, the margin slightly thickened. — Open woodland, near Washington, D. C. (*Steele*).

1023. L. pulchella.

11. **L. pulchélla** (Pursh) DC. (Blue L.) Pale or glaucous; stem simple, 1 m. or less high; *leaves* sessile, *glabrous, oblong- or linear-lanceolate, entire, or the lower runcinate-pinnatifid;* heads few and large, racemose, erect on scaly-bracted peduncles; involucral bracts imbricated in 3–4 ranks. — Upper Mich. and Ont., westw. and southw. Fig. 1023.

§ 3. MULGÈDIUM (Cass.) Gray. *Achenes thickish, oblong, contracted into a short thick beak or neck; annual or biennial; flowers chiefly blue.*

* *Pappus white.*

1024. L. villosa.

12. L. villòsa Jacq. Tall biennial, 1-2 m. high, with many small heads in a loose panicle, on diverging peduncles; leaves ovate to oblong-lanceolate, pointed, sharply and sometimes doubly serrate, or runcinate, sometimes hairy on the midrib beneath, contracted into a winged petiole, the lowest occasionally sinuate or cleft at base, and the cauline sagittate or hastate; *achenes beakless.* (*L. acuminata* Gray.) — Borders of woods, N. Y. to Neb., and southw. Fig. 1024.

1025. L. floridana.

13. L. floridàna (L.) Gaertn. Leaves all lyrate or runcinate, or rarely entire, the upper often with a heart-shaped clasping base; panicle larger; *achenes* distinctly *beaked;* otherwise as no. 12. — Rich soil, N. Y. and Pa. to Neb., and southw. Fig. 1025.

** *Pappus tawny.*

1026. L. spicata.

14. L. spicàta (Lam.) Hitchc. Nearly smooth biennial, tall (1-3.5 m. high), very leafy; leaves irregularly pinnatifid, sometimes runcinate, coarsely toothed, the upper cauline sessile and auriculate, sometimes clasping; heads in a large and dense compound panicle; flowers bluish to cream-color; achene short-beaked. (*L. leucophoea* Gray.) — Low grounds, rather common. Fig. 1026. Var. INTEGRIFÒLIA (Gray) Britton. Leaves undivided, or the lower sinuate-pinnatifid. — Me. to Ill. and N. C.

101. LYGODÉSMIA D. Don.

Heads and flowers (5-10) nearly as in *Prenanthes*, the cylindrical involucre more elongated, and the achenes long and slender, tapering at the summit; pappus whitish. — Smooth, often glaucous, with terminal or scattered heads of rose-purple flowers on the leafless or rush-like stems or branches. (Name composed of λύγος, *a pliant twig*, and δέσμη, *a bundle*, from the fascicled twiggy or rush-like stems.)

1027. L. juncea. Heads × ⅔. Achene × 1⅓.

1. L. júncea (Pursh) D. Don. Perennial, 2-4 dm. high, tufted, rigid, much branched; *lower leaves* lance-linear, 2.5-5 *cm. long, rigid, the upper awl-shaped and minute; heads* 5-flowered, *terminal; achene filiform, only slightly attenuate above*, 4-5 *mm. long.* — Plains, St. Croix River, Wisc. to the Saskatchewan, Mo., and westw. June-Sept. Fig. 1027.

1028. L. rostrata. Achene × 1⅓.

2. L. rostràta Gray. Annual, 1 m. or less high, corymbose-paniculate; *leaves* elongate, *the lower* about 1 *dm. long; heads* 8-9-flowered, *scattered; achene fusiform, distinctly attenuate above*, 1 *cm. long.* — Sandy soil, Kan. to the Saskatchewan, and westw. Aug.-Sept. Fig. 1028.

102. AGÓSERIS Raf.

Head large, solitary, many-flowered. Bracts of the bell-shaped involucre ovate or lanceolate, pointed, loosely imbricated in 2 or 3 rows. Achenes smooth, 10-ribbed, with or without a distinct beak; pappus usually longer than the achene, white, of copious and unequal rigid capillary bristles. — Perennial scapose herbs, with elongated linear tufted basal leaves, and yellow flowers. (Name from αἴξ, *goat*, and σέρις, *chicory*.)

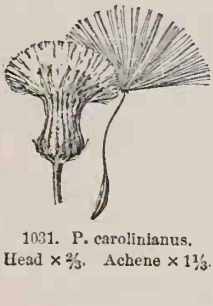
1029. A. cuspidata. Head × 2/3 Achene × 1 1/3.

1. **A. cuspidàta** (Pursh) Steud. Scape 3 dm. high, from a thickened caudex; leaves lanceolate, elongated, tapering to a sharp point, entire, woolly on the margins; bracts of the involucre lanceolate, sharp-pointed; *achene beakless.* (*Troximon* Pursh; *Nothocalais* Greene.) — Prairies, Wisc. and n. Ill., westw. and northwestw. Apr., May. Fig. 1029.

2. **A. glaúca** (Pursh) Steud. Scape 3–6 dm. high; leaves linear to lanceolate, entire to dentate or laciniate; head often pubescent or villous; *achene long-beaked.* (*Troximon* Pursh.) — Minn. to the Saskatchewan, southw. and westw. Fig. 1030.

1030. A. glauca. Achene × 1 1/3.

103. PYRRHOPÁPPUS DC. False Dandelion



1031. P. carolinianus. Head × 2/3. Achene × 1 1/3.

Heads, etc., nearly as in *Taraxacum*, but the soft pappus reddish or rust-color, and surrounded at base by a soft-villous ring. — Mostly annual or biennial herbs, scapose or often branching and leafy below. Heads solitary, terminal. Flowers deep yellow. (Name composed of πυῤῥός, *flame-colored*, and παππός, *pappus.*) Sitilias Raf.

1. **P. caroliniànus** (Walt.) DC. Annual or biennial, branching, 1–9 dm. high; leaves oblong or lanceolate, entire, cut or pinnatifid, the stem-leaves partly clasping. (*Sitilias* Raf.) — Sandy fields, Del. to Mo., Kan., and southw. Apr.–July. Fig. 1031.

104. CRÈPIS L. Hawk's Beard

Involucre few-many-flowered, commonly of a single row of equal bracts often becoming thickened at base. Pappus copious, white, soft. — Annuals or biennials, not pilose. Otherwise as *Hieracium.* (The Greek name of some plant, from κρηπίς, *a sandal.*)

* *Involucre glabrous.*

1. **C. púlchra** L. Annual, 0.3–1.5 m. high, pubescent below, leafy near the base; leaves pubescent, oblong or oblong-lanceolate, runcinate-dentate, the lower on margined petioles, the upper somewhat clasping; heads in a loose naked panicle; involucre 1 cm. high — Locally established in Va. (Adv. from Eu.)

* * *Involucre pubescent.*

+ *Perennial; scapose or nearly so.*

2. **C. runcinàta** (James) T. & G. Stem 3–9 m. high, glabrous or somewhat glandular-hispid; leaves rosulate, obovate-oblong or oblong-spatulate, repand or runcinate-dentate, glabrous or slightly hispidulous; heads loosely corymbose, 2 cm. broad; involucre hirsute, 1 cm. or so high. — On saline soil, Man. to Ia., and westw June, July

+ + *Annuals or biennials; stems leafy*

3. **C. capillàris** (L.) Wallr Ascending, 3–6 dm. high; leaves lance-spatulate, laciniate-pinnatifid or merely dentate, the cauline with sagittate-auriculate bases; heads small, involucre 6–7 mm. high; *achenes smooth, 10-nerved, slightly narrowed at both ends.* (*C. virens* L.) — Fields and waste places, becoming frequent. (Adv. from Eu.) Fig. 1032.

1032. C. capillaris Achene × 1 1/3.

1033. C. tectorum. Head × 2/3. Achene × 1 1/3.

4. C. TECTÒRUM L. Slender, branching from the base, 2–4 dm. high; leaves narrow, runcinate, often sagittate-auriculate; heads small, in a loose panicle; *achenes fusiform, attenuate above, the ribs upwardly scabrous.* — In fields, Ont., Mich., and Neb.; and on ballast eastw. July–Sept. (Adv. from Eu.) FIG. 1033.

5. C. BIÉNNIS L. Somewhat pubescent, 6–8 dm. high, leafy; leaves runcinate-pinnatifid; heads rather large, 2–4 cm. broad, corymbose; *achenes 13-nerved, glabrous, attenuate above.* — Locally in fields and waste places, N. E. to Pa. and Mich. (Adv. from Eu.) FIG. 1034.

1034. C. biennis. Achene × 1 1/3.

105. PRENÁNTHES [Vaill.] L. RATTLESNAKE-ROOT

Heads 5–30-flowered. Involucre cylindrical, of 5–14 linear bracts in a single row, and a few small bractlets at base. Achenes short, linear-oblong, striate or grooved, not contracted at the apex. Pappus of copious whitish, straw-colored, or brownish rough capillary bristles. — Perennial herbs, with upright leafy stems arising from spindle-shaped (extremely bitter) tubers, very variable leaves, and racemose-panicled mostly nodding heads. Flowers in late summer and autumn. (Name from πρηνής, *drooping*, and ἄνθη, *blossom*.) NABALUS Cass.

* *Heads rather broad, 25–35-flowered, in a corymbose panicle.*

1. P. crepidínea Michx. Somewhat smooth; stem stout, 1.5–2.7 m. high, bearing numerous nodding heads in loose clusters; leaves large (1.5–3 dm. long), broadly triangular-ovate or halberd-form, strongly toothed, contracted into winged petioles; flowers cream-color; pappus brown. (*Nabalus* DC.) — Rich soil, w. N. Y. to Minn., and southw. Sept., Oct.

* * *Heads slender, 8–15-flowered, in a long raceme-like or thyrsoid inflorescence; stems simple; cauline leaves sessile; pappus straw-color.*

← *Inflorescence pubescent, strict; heads nearly erect, 12–15-flowered.*

2. P. racemòsa Michx. *Stem* 0.2–1.5 m. high, *smooth and glaucous, as well as the* oval or oblong-lanceolate denticulate *leaves;* the lower leaves tapering into winged petioles (rarely cut-pinnatifid), *the upper partly clasping;* heads in crowded clusters; flowers purplish. (*Nabalus* Hook.) — River-banks and prairies, e. Que. to Alb., s. to N. B., n. Me., Great L. region, Mo., S. Dak., and Col.; also in marshes of s. N. Y. and n. N. J. Aug., Sept. Var. PINNATÍFIDA Gray. Leaves all lyrately pinnatifid. — Marshes, s. N. Y. and n. N. J.; also in Ont. (according to Macoun).

3. P. áspera Michx. *Stem* 0.5–1.3 m. high, *rough-pubescent, as well as the* oval-oblong or broadly lanceolate toothed *leaves; upper leaves not clasping;* heads in small clusters; flowers larger, cream-color. (*Nabalus* T. & G.) — Dry prairies and barrens, O. to S. Dak., and southw. Aug., Sept.

← ← *Whole plant glabrous; heads nodding, 8–12-flowered; thyrse looser.*

4. P. virgàta Michx. (SLENDER R.) Slightly glaucous; stem 6–12 dm. high, prolonged into a naked and slender spiked raceme (4–6 dm. long); heads clustered and mostly unilateral; *leaves lanceolate,* acute, *closely sessile, the upper reduced to bracts,* the lower toothed or pinnatifid; involucre (purplish) of about 8 bracts. (*Nabalus* DC.) — Sandy pine barrens, N. J. to Fla. Sept., Oct.

5. P. mainénsis Gray. Stem 0.5–1 m. high, leafy; *leaves* as in no. 2, but *the radical ovate* and more *abruptly narrowed to the short petiole;* heads persistently drooping on slender pedicels. — St. John and Aroostook valleys, Me. and N. B. Aug., Sept. — Perhaps a hybrid between nos. 2 and 8.

* * * *Heads 5–18-flowered, racemose or paniculate, commonly pendulous; leaves variable, mostly petiolate, the lower cordate or truncate or hastate at base.*

← *Involucre cylindrical (at least below the middle); bracts scarious-margined, the outer numerous, short, appressed.*

↔ *Involucre of 6–8 primary bracts, 8–12-flowered.*

= *Pappus deep reddish-brown.*

6. **P. álba** L. (White Lettuce, Rattlesnake-root.) Smooth and glaucous; stem stout, usually purplish, 0.5–1.5 m. high, corymbose-panicled at summit; leaves angulate or triangular-halberd-form, sinuate-toothed or 3–5-cleft, the uppermost oblong and undivided; involucre whitish-green and purplish, glaucous; flowers whitish. (*Nabalus* Hook.) — Rich woods and thickets, s. Me. to the Saskatchewan, s. to Ga., Ky., and Ill. Late July–early Oct.

= = *Pappus whitish or brownish-white.*

a. Primary bracts scarcely as long as the pappus, the small outer ones lanceolate.

7. **P. serpentária** Pursh. (Lion's-foot, Gall-of-the-earth.) Stem smooth, 3–12 dm. high, usually purplish, *corymbose-panicled at summit; leaves thick*, variously lobed, often pinnatifid with blunt or rounded lobes, or even entire, the lower on margined petioles; *heads chiefly clustered at the tips of elongate branches; involucre funnel-form, cylindric below, its* subherbaceous green or purplish frequently *setulose bracts abruptly spreading above the middle;* flowers purplish, greenish-white, or cream-color; achenes yellow-brown. (*Nabalus* Hook.) — Dry open soil, e. Mass. to Fla. and Ala. Sept., Oct. Fig. 1035.

1035. P. serpentaria. Heads × ⅔.

b. Primary bracts as long as the pappus, the small outer ones deltoid to ovate.

8. **P. trifoliolàta** (Cass.) Fernald. (Gall-of-the-earth.) Glabrous, 1.5–15 dm. high; *leaves thinnish*, nearly all petioled; the lower mostly 3-divided or angulate, occasionally uncleft or with the divisions finely dissected; *inflorescence an elongate panicle, the heads clustered at the tips of comparatively short ascending branches or in the upper axils; involucre cylindric, glaucous; its pale green or purple-tinged primary bracts linear-lanceolate*, acute, *the inner with broad scarious margins; outer calyculate bracts lance-deltoid*, rather firm, with pale hyaline margins, *regularly imbricated, the longest* 1.5–2.5 *mm. long;* achenes yellow-brown. (*Nabalus* Cass.; *P. serpentaria* Man. ed. 6, in part, not Pursh.) — Thickets and woods, Nfd. and Que. to Del., Pa., and along the mts. to Tenn. Aug., Sept. Fig. 1036.

1036. P. trifoliolata. Heads × ⅔.

9. **P. nàna** (Bigel.) Torr. Stem simple and strict, 0.5–7.5 dm. high; leaves much as in the preceding, very variable in outline; *inflorescence a thyrse or raceme*, rarely somewhat paniculate or subcorymbose; *involucre thick-cylindric*, glabrous; *bracts lead-color or blackish; the primary ones linear- to lance-oblong*, blunt or acutish, *the inner with narrow scarious margins; outer calyculate bracts ovate to ovate-lanceolate, blackish-green*, herbaceous or fleshy, *very unequal, the longest* 3–6 *mm. long;* achenes yellowish- to reddish-brown. (*Nabalus* DC.; *P. serpentaria*, var. Gray; *P. trifoliolata*, var. Fernald.) — Rocky or mossy places, Lab. and Nfd. to the coast of N. S., and the higher mts. of n. N. E. and n. N. Y. July–Sept.

↔ ↔ *Involucre of 5 primary bracts, 5–6-flowered.*

10. **P. altíssima** L. Smooth, tall and slender, 1–2 m. high; heads in small axillary and terminal loose clusters forming a long and wand-like leafy panicle; leaves membranaceous, all petioled, ovate, heart-shaped, or triangular, and merely toothed or cleft, with naked or winged petioles, or frequently 3–5-parted,

with the divisions entire or again cleft; *involucre very slender*, greenish; flower greenish-white; pappus cream-color. (*Nabalus* Hook.) — Rich moist woods, Nfd. to Man., s. to Ga. and Tenn. Late July–early Oct. Var. HISPÍDULA Fernald. Stems villous or hispid; leaves at least hispidulous on the veins beneath. — Wet woods, e. Que. to Vt. and Ct.

Var. cinnamòmea Fernald. Pappus cinnamon-color or deep brown. — Ind. to Mo. and La.

← ← *Involucre slender-campanulate; secondary basal bracts 2–3, linear, loose.*

11. P. Boóttii (DC.) Gray. Simple, dwarf, 1–3 dm. high, pubescent at the summit; the heads in an almost simple raceme; lowest leaves halberd-shaped or heart-shaped, the middle oblong, the upper lanceolate, nearly entire, tapering into a margined petiole; involucre livid, 10–18-flowered; the primary bracts 10–15, very obtuse; pappus pale straw-color. — Alpine regions, n. N. E. and n. N. Y. July–Sept.

106. HIERÀCIUM [Tourn.] L. HAWKWEED

Heads 12–many-flowered. Involucre more or less imbricated. Achenes short, oblong or columnar, striate, not beaked; pappus a single row of tawny and fragile capillary rough bristles. — Hispid or hirsute and often glandular perennials, with entire or toothed leaves, and single or panicled heads of mostly yellow flowers; summer and early autumn. (Name from ἱέραξ, *a hawk.*)

* *Rootstock slender, elongated; stolons usually present; scapose.*

← *Scape 1–3(–4)-headed.*

1. H. PILOSÉLLA L. (MOUSE-EAR.) Leaves oblong-lanceolate or spatulate, 2–6 cm. long, setose upon both surfaces, green above, whitened beneath with close stellate tomentum; stolons several, slender, leafy; scape 5–20 cm. high, 1-headed; heads 2.5–3 cm. broad; flowers yellow. — Grassland, becoming frequent. June, July. (Nat. from Eu.)

Var. VÍRIDE Ser. Coarser; leaves often 1 dm. long, green on both surfaces; scape 1–3(–4)-headed, 1.5–4 dm. high. — Fields, pastures, etc., also becoming too frequent. June, July. (Nat. from Eu.)

← ← *Scape bearing several–many heads in a rather dense corymb.*

→ *Flowers orange-red.*

2. H. AURANTÌACUM L. (ORANGE H., DEVIL'S PAINT-BRUSH, GRIM THE COLLIER.) Long-hirsute; leaves oblanceolate, 6–15 cm. long, green on both sides; stolons numerous, slender; scape 2–6 dm. high, usually 1–2-bracted; heads about 2 cm. broad. — Fields, etc., e. Que. to Ont. and Pa., locally too abundant. June, July. (Nat. from Eu.)

→ → *Flowers yellow.*

3. H. FLORIBÚNDUM Wimm. & Grab. *Glaucous;* stolons numerous; basal *leaves* narrowly oblanceolate, 5–15 cm. long, essentially *glabrous above*, setose on the margin, midrib, and sometimes very sparingly on the surface beneath; primary scape 3–8 dm. high, usually naked or with only 1 leaf near the base; involucre nigrescent; flowers bright yellow. — Fields and open ground, N. B. and e. Me. June, July. (Nat. from Eu.) — Luxuriant plants developing decumbent leafy secondary flowering axes as well as stolons.

4. H. PRATÉNSE Tausch. (KING DEVIL.) *Green*, not glaucous; stolons few; basal *leaves* narrowly oblong to oblanceolate, 1–2.5 dm. long, *setose upon both surfaces;* scape 4–8 dm. high, bearing 1–3 well developed leaves; otherwise like the preceding. — Fields, roadsides, etc., e. Que. to s. N. Y. June–Aug. (Nat. from Eu.)

** * Rootstock short, stout, praemorse.*

← Heads small, 1–2.3 cm. in diameter.

↔ Inflorescence a corymbiform panicle (sometimes subcylindric in no. **11**, *which has leafy bracts).*

= Leaves (at least those of the primary axis) chiefly basal.

a. Leaves narrowly oblanceolate or spatulate, glaucous.

5. **H.** PRAEÁLTUM Gochnat, var. DECÍPIENS Koch. Somewhat glaucous, bearing *numerous slender elongated leafy branches from the base; basal leaves* narrowly oblanceolate to linear-oblong, somewhat hispid on both surfaces and *finely stellate-pubescent beneath;* scape tall, setose; corymb irregular; flowers yellow. — Established in a dry pasture, Andover, Mass. (*A. S. Pease*). June. (Adv. from Eu.)

6. **H.** FLORENTÌNUM All. (KING DEVIL.) *Without slender leafy branches* from the base, smoothish; *basal leaves* oblanceolate to spatulate, thickish, sparingly setose or more often *glabrous;* scape 3–8 dm. high, smooth or sparingly setose; corymb many-headed. (*H. praealtum* Man. ed. 6, not Gochnat.) — Open places, fields, etc., e. Que. to n. N. Y. (Nat. from Eu.)

b. Leaves elliptic-oblong.

7. **H. venòsum** L. (RATTLESNAKE-WEED, POOR ROBIN'S PLANTAIN.) *Scape* 2–7 dm. high, naked, or with 1 rarely 2 leaves (var. SUBCAULÉSCENS T. & G.), *smooth*, slender, forking above into a loose corymb; *leaves* nearly entire, scarcely petioled, thin, *glabrous* and often purple-veined or mottled *above*, glaucous beneath; *pedicels* very slender, *sparingly glandular-pubescent* toward the tip. — Dry woods and open sandy places, s. Me. to Ga., and westw. Late May–Sept.

8. **H. Greènii** Porter & Britton. *Scape* 2–7 dm. high, usually *spreading-villous* especially below, naked or more often with 1–2 leaves near the base; *leaves* spatulate to obovate, green, conspicuously *sordid- or tawny-villous on both surfaces; inflorescence copiously glandular-hispid.* (*H. marianum*, var. *spathulatum* Gray.) — Dry woods, Pa. and O. to Mo., and southw.

= = Stem leafy to the inflorescence.

9. **H. paniculàtum** L. Stem slender, 3–12 dm. high, glabrous except at the villous base; *leaves* thin, lanceolate, *remotely toothed*, acute, *glabrous*, glaucous beneath; panicle lax; *heads* comparatively *small* (12–20-*flowered*), on filiform smoothish pedicels. — Open woods, N. S. and centr. Me. to Mich., s. to Ga. and Ala. Late July–Sept.

10. **H. mariànum** Willd. Stouter; stem setose at least below; *leaves* obovate-oblong, obtuse or rounded at tip, *subentire;* the basal large, on hairy winged petioles, green or rarely purple-veined, *glabrous above, hairy on the veins beneath;* panicle open, corymbiform; *heads larger* (20–40-*flowered*), on whitish-tomentose and glandular-hispid pedicels. — Open woods and clearings, N. H. to O., and southw. June–Aug.

11. **H. scàbrum** Michx. Stoutish, 3–12 dm. high, rough-hairy; *leaves* elliptic to spatulate-obovate, obtuse, *subentire*, thickish, *hairy on both surfaces*, deep green above, paler beneath; panicle stiff, corymbiform, its axis and branches densely white-tomentose and commonly covered with numerous dark glands; *heads* 40–50-*flowered*, on thickish pedicels. — Dry woods and pastures, frequent. July–Sept.

↔ ↔ Inflorescence more slender and elongated, subcylindric, not leafy-bracted.

12. **H. Gronòvii** L. Stem wand-like, 3–12 dm. high, leafy chiefly below the middle, villous at base; *basal leaves* oblong to obovate, 5–15 cm. long, *rounded or obtuse* at the tip, setose chiefly above, minutely stellate-pubescent beneath; the stem-leaves similar, decreasing rapidly in size; panicle thyrsoid, 1–4 dm. long, without leafy bracts; heads 15–20-flowered, on slightly glandular pedicels. — Sandy soil, Mass. to Ont., Kan., and southw. Aug.–Oct.

13. **H. longípilum** Torr. Similar, copiously *covered with extremely long* (1–2 *cm.*) soft white to tawny *hairs; basal leaves* oblanceolate, *acutish*, 1.3–3 dm. long; upper leaves similar, much smaller; heads 20–30-flowered; pedicels copiously glandular. — Open woods and prairies, Mich. to Minn., southw. and southwestw. Aug., Sept.

← ← *Heads large*, 2.5–4.5 *cm. in diameter.*

→ *Basal leaves elliptic to ovate, slender-petioled, the cauline rather few.*

14. **H.** MURÒRUM L. (GOLDEN LUNGWORT.) *Scape naked or with a single leaf*, 2–7 dm. high, smoothish; *leaves* green, *not mottled;* the basal *toothed* or incised especially *near the rounded or subcordate base;* heads few; involucre densely glandular. — Established in open woods, Northampton, Mass. (*Mrs. Terry*) and near Brooklyn, N. Y. May, June. (Adv. from Eu.)

15. **H.** VULGÀTUM Fries. *Stem bearing 2–several leaves*, 1.5–8 dm. tall, rather slender and flexuous; basal *leaves* lanceolate to ovate, acute, *tapering to the petiole*, remotely dentate, usually *purplish-mottled above;* heads 1–several, about 4 cm. in diameter. — Fields, open woods, and ledgy shores, Nfd. to w. Que. and locally s. to s. N. Y. June-Sept. (Nat. from Eu.)

→ → *Basal leaves lance-oblong, scarcely petioled, the cauline numerous.*

16. **H. canadénse** Michx. Stoutish, 2–12 dm. high; *leaves ovate to lance-oblong*, spreading, coarsely toothed especially below the middle, acute, firm in texture, at least the upper *rounded or subcordate at the base;* heads several, in a corymb. — Borders of woods, shores, etc., Nfd. to B. C., s. to N. J., Pa., the Great L. region, and Ore. July–Sept.

17. **H. umbellàtum** L. Similar; *leaves lance-linear to lanceolate, attenuate to a narrow* sessile *base*, entire or nearly so; heads few, subumbellate. — L. Superior, northw. and westw. (Eurasia.)

GLOSSARY

Abortion. Imperfect development or non-development of an organ.

Abortive. Defective or barren.

Acaulescent. Stemless or apparently so, or with stem subterranean.

Accumbent (cotyledon). Having the edges against the radicle.

Achene. A small dry and hard 1-celled 1-seeded indehiscent fruit.

Achlamydeous. Without calyx or corolla.

Acicular. Slenderly needle-shaped.

Aculeate. Prickly; beset with prickles.

Aculeolate. Beset with diminutive prickles.

Acuminate. Tapering at the end.

Acute. Terminating with a sharp or well defined angle.

Adnate. United, as the inferior ovary with the calyx-tube. *Adnate anther*, one attached for its whole length to the inner or outer face of the filament.

Adventive. Imperfectly naturalized.

Aestivation. The arrangement of the parts of the perianth in the bud.

Alate. Winged.

Albumen. Any deposit of nutritive material accompanying the embryo.

Albuminous. Having albumen.

Alliaceous. Having the smell or taste of garlic.

Alternate (of leaves, etc.). Not opposite to each other on the axis, but arranged singly at different heights.

Alveolate. Honeycombed; having angular depressions separated by thin partitions.

Alveolation. A honeycombed condition.

Ament. A catkin, or scaly spike.

Amphigean. Native of both Old and New Worlds.

Amphitropous (ovule or seed). Half-inverted and straight, with the hilum lateral.

Amplexicaul. Clasping the stem.

Anastomosing. Connecting by cross-veins and forming a network.

Anatropous (ovule). Inverted and straight, with the micropyle next the hilum and the radicle consequently inferior.

Ancipital. Two-edged.

Androgynous (inflorescence). Composed of both staminate and pistillate flowers.

Androsporangium. The receptacle in which androspores are formed.

Androspore. The minute reproductive body, which gives rise to the (often exceedingly obscure) male plantlet in the sexual generation. The same as Microspore.

-androus. In composition, having stamens.

Angiospermous. Having the seeds borne within a pericarp.

Annual. Of only one year's duration. *Winter annual*, a plant from autumn-sown seed which blooms and fruits in the following spring.

Annular. In the form of a ring.

Anterior. On the front side of a flower and next the bract, remote from the axis of inflorescence; equivalent to inferior and (less properly) exterior.

Anther. The polliniferous part of a stamen.

Antheridium. In Cryptogams, the organ corresponding to an anther.

Antheriferous. Anther-bearing.

Antherozoid. One of the minute organs developed in an antheridium.

Anthesis. The time of expansion of a flower.

Apetalous. Having no petals.

Apiculate. Ending in a short pointed tip.

Apogamous. Developed without fertilization.

Appressed. Lying close and flat against.

Arachnoid. Cobwebby; of slender entangled hairs.

Archegonium. The organ in the higher Cryptogams corresponding to a pistil in the Flowering Plants.

Arcuate. Moderately curved.

Areolate. Marked out into small spaces; reticulate.

Areole. A small space marked out upon a surface.

Aril. An appendage growing at or about the hilum of a seed.

Arillate. Having an aril.

Aristate. Awned; provided with stiffish bristle-shaped appendages.

Articulate. Jointed; having a node or joint.

Ascending. Rising somewhat obliquely, or curving upward. *Ascending ovule*, one that is attached above the base of the ovary and is directed upward.

Assurgent. Ascending.

Attenuate. Slenderly tapering; becoming very narrow.

Auricle. An ear-shaped appendage.

Auriculate. Furnished with auricles.

Awl-shaped. Tapering upward from the base to a slender or rigid point.

Awn. A bristle-shaped appendage.

Axil. The angle formed by a leaf or branch with the stem.

Axile. Situated in the axis.

Axillary. Situated in an axil.

Axis. The central line of any organ or support of a group of organs; a stem, etc.

Baccate. Berry-like; pulpy throughout.
Barbed. Furnished with rigid points or short bristles, usually reflexed like the barb of a fish hook.
Barbellate. Finely barbed.
Barbulate. Finely bearded.
Basifixed. Attached by the base.
Bast. The fibrous portion of the inner bark.
Beaked. Ending in a prolonged tip.
Bearded. Bearing a long awn, or furnished with long or stiff hairs.
Berry. A fruit, the whole pericarp of which is fleshy or pulpy.
Bi- or *Bis-.* A Latin prefix signifying two, twice, or doubly.
Bidentate. Having two teeth.
Biennial. Of two years' duration
Bifid. Two-cleft.
Bilabiate. Two-lipped.
Bilocular. Two-celled.
Bisexual. Having both stamens and pistils.
Bivalvular. With two valves.
Blade. The expanded portion of a leaf, etc.
Bract. A more or less modified leaf subtending a flower or belonging to an inflorescence or sometimes cauline.
Bracteal. Of or pertaining to the bracts.
Bracteate. Having bracts.
Bracteolate. Having bractlets.
Bracteole. Bractlet.
Bracteose. With numerous or conspicuous bracts.
Bractlet. A secondary bract, as one upon the pedicel of a flower.
Bud. The rudimentary state of a stem or branch; an unexpanded flower.
Bulb. A subterranean leaf-bud with fleshy scales or coats.
Bulbiferous. Bearing bulbs.
Bulblet. A small bulb, especially one borne upon the stem.
Bulbous. Having the character of a bulb.
Bullate. Blistered or puckered.
Bursicle. A pouch-like receptacle.

Caducous. Falling off very early.
Caespitose. See Cespitose
Calcarate. Produced into or having a spur
Callosity. A hardened thickening.
Callus. A hard protuberance or callosity; in the Grasses the tough often hairy swelling at the base or insertion of the lemma or palet.
Calyculate. Having bracts around the calyx or involucre imitating an outer calyx.
Calyx. The outer perianth of the flower
Campanulate. Bell-shaped; cup-shaped with a broad base.
Campylotropous (ovule or seed). So curved as to bring the apex and base nearly together.
Canaliculate. Longitudinally channeled.
Canescent. Hoary with gray pubescence.
Capillary. Hair-like.
Capitate. Shaped like a head; collected into a head or dense cluster.
Capsular. Belonging to or of the nature of a capsule.
Capsule. A dry dehiscent fruit composed of more than one carpel.
Carinal. On or having relation to a ridge or keel.
Carinate. Having a keel or projecting longitudinal medial line on the lower surface.
Carpel. A simple pistil, or one member of a compound pistil.
Carpophore. The slender prolongation of the floral axis which in the *Umbelliferae* supports the pendulous ripe carpels.
Caruncle. An excrescence or appendage at or about the hilum of a seed.
Carunculate. Having a caruncle.
Caryopsis. A grain, as of Grasses; a seed-like fruit with a thin pericarp adnate to the contained seed.
Castaneous. Of a chestnut-color; dark brown.
Catkin. An ament.
Caudate. Having a slender tail-like appendage.
Caudex. The persistent base of an otherwise annual herbaceous stem.
Caudicle. The thread-like or strap-shaped stalk of a pollinium.
Caulescent. Having a manifest stem above ground.
Cauline. Belonging to the stem.
Cell. One of the minute vesicles, of very various forms, of which plants are formed. Any structure containing a cavity, as the cells of an anther, ovary, etc.
Cellular (tissue). Composed of short transparent thin-walled cells, in distinction from fibrous or vascular.
Centrum. The central portion; here used specifically for the large central air-space in hollow stems such as those of *Equisetum.*
Cespitose (or *Caespitose*). Growing in tufts; forming mats or turf.
Chaff. A small thin scale or bract, becoming dry and membranous.
Chaffy. Having or resembling chaff.
Channeled. Deeply grooved longitudinally, like a gutter.
Chartaceous. Having the texture of writing-paper.
Chlorophyll. The green coloring-matter within the cells of plants.
Chlorophyllose. Containing chlorophyll.
Ciliate. Marginally fringed with hairs.
Ciliolate. Minutely ciliate.
Cinereous. Ash-color.
Circinate. Coiled from the top downward, as the young frond of a fern.
Circumscissile. Dehiscing by a regular transverse circular line of division.
Clavate. Club-shaped; gradually thickened upward.
Cleistogamous. Fertilized in the bud, without the opening of the flower.
Coalescence. The union of parts or organs of the same kind
Coccus (pl. *Cocci*). One of the parts into which a lobed fruit with 1-seeded cells splits.
Cochleate. Spiral, like a snail-shell.
Cohesion. The union of one organ with another of like nature.

Commissure. The surface by which one carpel joins another, as in the *Umbelliferae.*
Comose. Furnished with or resembling a tuft of hairs.
Complicate. Folded upon itself.
Compound. Composed of 2 or more similar parts united into one whole. *Compound leaf,* one divided into separate leaflets.
Compressed. Flattened, especially laterally.
Conduplicate. Folded together lengthwise.
Confluent. Running into each other; blended into one.
Coniferous. Cone-bearing.
Connate. United; used especially of like structures joined from the start.
Connective. The portion of a stamen which connects the two cells of the anther.
Connivent. Coming into contact; converging.
Conoidal. Nearly conical.
Convolute. Rolled up longitudinally.
Cordate. Heart-shaped with the point upward.
Coriaceous. Leathery in textnre.
Corm. The enlarged fleshy base of a stem, bulb-like but solid.
Corolla. The inner perianth, of distinct or connate petals.
Coroniform. Shaped like a crown.
Corrugate. Wrinkled or in folds.
Corymb. A flat-topped or convex open flower-cluster, in the stricter use of the word equivalent to a contracted raceme and progressing in its flowering from the margin inward.
Corymbose. In corymbs, or corymb-like.
Costa. A rib; a midrib or mid-nerve.
Costate. Ribbed; having one or more longitudinal ribs or nerves.
Cotyledons. The foliar portion or first leaves (one, two, or more) of the embryo as found in the seed.
Crateriform. In the shape of a saucer or cup, hemispherical or more shallow.
Creeping. Running along at or near the snrface of the ground and rooting.
Crenate. Dentate with the teeth mnch rounded.
Crenulate. Finely crenate.
Cristate. Bearing an elevated appendage resembling a crest.
Crown. An inner appendage to a petal, or to the throat of a corolla.
Cruciate. Cross-shaped.
Crustaceous. Of hard and brittle texture.
Cucullate. Hooded or hood-shaped; cowled.
Culm. The peculiar stem of Sedges and Grasses.
Cuneate. Wedge-shaped; triangular with the acute angle downward.
Cuspidate. Tipped with a *cusp* or sharp and rigid point.
Cyme. A usually broad and flattish determinate inflorescence, *i.e.* with its central or terminal flowers blooming earliest.
Cymose. Bearing cymes, or cyme-like.

Deciduous. Not persistent; not evergreen.
Decompound. More than once compound or divided.
Decumbent. Reclining, but with the summi ascending.
Decurrent (leaf). Extending down the stem below the insertion.
Decussate. Alternating in pairs at right angles.
Definite. Of a constant number, not exceeding twenty.
Deflexed. Bent or turned abrnptly downward.
Dehiscent. Opening regularly by valves, slits, etc., as a capsule or anther.
Deltoid. Shaped like the Greek letter Δ.
Dentate. Toothed, usually with the teeth directed outward.
Denticulate. Minutely dentate.
Depressed. Somewhat flattened from above.
Di-, Dis-. A Greek prefix signifying two or twice.
Diadelphous (stamens). Combined in two sets.
Diandrous. Having two stamens.
Dicarpellary. Composed of two carpels.
Dichotomous. Forking regularly by pairs.
Dicotyledonous. Having two cotyledons.
Didymous. Twin; found in pairs.
Didynamous (stamens). In two pairs of unequal length.
Diffuse. Widely or loosely spreading.
Digitate. Compound, with the members arising together at the apex of the support.
Dimerous (flower). Having all the parts in twos.
Dimorphous. Occurring in two forms.
Dioecious. Unisexual, with the two kinds of flowers on separate plants.
Discoid. Resembling a disk. *Discoid head,* in *Compositae,* one without ray-flowers.
Disk. A development of the receptacle at or around the base of the pistil. In *Compositae,* the tubular flowers of the head as distinct from the ray.
Dissected. Cut or divided into numerous segments.
Dissepiment. A partition in an ovary or fruit.
Distichous. In two vertical ranks.
Distinct. Separate; not united; evident.
Divaricate. Widely divergent.
Divided. Lobed to the base.
Dorsal. Upon or relating to the back or outer surface of an organ.
Dorsoventral. With distinction of back and front, or placed with reference to the back or front.
Drupaceous. Resembling or of the nature of a drupe.
Drupe. A fleshy or pulpy fruit with the inner portion of the pericarp (1-celled and 1-seeded, or sometimes several-celled) hard or stony.
Drupelet. A diminutive drupe.

E- or *Ex-.* A Latin prefix having often a privative signification, as *ebracteate,* without bracts.
Echinate. Beset with prickles.
Ecological. Concerning the relation of plants to their surroundings.
Effuse. Very loosely spreading.
Emarginate. Having a shallow notch at the extremity.

Embryo. The rudimentary plantlet within the seed.
Endocarp. The inner layer of a pericarp.
Endogenous. Growing throughout the substance of the stem, instead of by superficial layers.
Entire. Without toothing or division.
Ephemeral. Lasting for only one day.
Epicarp. The outer layer of the pericarp or matured ovary.
Epidermis. The superficial layer of cells.
Epigynous. Growing on the summit of the ovary, or apparently so.
Epiphyte. A plant growing attached to another plant, but not parasitic; an air-plant.
Equitant. Astride; used of conduplicate leaves which enfold each other in two ranks, as in *Iris*.
Erose. As if gnawed.
Exalbuminous. Without albumen.
Excurrent. Running out, as a nerve of a leaf projecting beyond the margin.
Exfoliating. Cleaving off in thin layers.
Exogenous. Growing by annular layers near the surface; belonging to the Exogens.
Exserted. Projecting beyond an envelope, as stamens from a corolla.
Exsiccated. Dried.
Extrorse. Facing outward.

Falcate. Scythe-shaped; curved and flat, tapering gradually.
Farinaceous. Containing starch; starch-like.
Farinose. Covered with a meal-like powder.
Fascicle. A close bundle or cluster.
Fasciculate. In close bundles or clusters.
Fastigiate (branches). Erect and near together.
Ferruginous. Rust-color.
Fertile. Capable of producing fruit; or productive, as a flower having a pistil, or an anther with pollen.
Fibrillose. Furnished or abounding with fine fibers.
Fibrous. Composed of or resembling fibers. *Fibrous tissue*, a tissue formed of elongated thick-walled cells.
Fibro-vascular. Composed of woody fibers and ducts.
Filament. The part of a stamen which supports the anther; any thread-like body.
Filamentous. Composed of threads.
Filiform. Thread-shaped; long, slender, and terete.
Fimbriate. Fringed.
Fimbrillate. Having a minute fringe.
Fistular. Hollow and cylindrical.
Flaccid. Without rigidity; lax and weak.
Flexuous. Zigzag; bending alternately in opposite directions.
Floccose. Clothed with locks or flocks of soft hair or wool.
Floret. A small flower, usually one of a dense cluster.
Floriferous. Flower-bearing.
Foliaceous. Leaf-like in texture or appearance.
Foliate. -leaved; having leaves.
Foliolate. Having leaflets.
Follose. Bearing numerous leaves.
Follicle. A fruit consisting of a single carpel, dehiscing by the ventral suture.
Follicular. Like a follicle.
Forked. Divided into nearly equal branches.
Free. Not adnate to other organs.
Frond. The leaf of Ferns and some other Cryptogams; in *Lemnaceae*, the thallus-like stem which functions as foliage.
Fructification. The act or organs of fruiting.
Fruit. The seed-bearing product of a plant, simple, compound, or aggregated, of whatever form.
Fugacious. Falling or fading very early.
Funicle. The free stalk of an ovule or seed.
Fuscous. Grayish-brown.
Fusiform. Spindle-shaped; swollen in the middle and narrowing toward each end.

Galea. A hooded or helmet-shaped portion of a perianth, as the upper sepal of *Aconitum*, and the upper lip of some bilabiate corollas.
Galeate. Helmet-shaped; having a galea.
Gamopetalous. Having the petals of the corolla more or less united.
Gamophyllous. Composed of coalescent leaves or leaf-like organs.
Gamosepalous. Having the sepals united.
Geminate. Equal, in pairs.
Gemma. A bud or body analogous to a bud by which a plant propagates itself.
Gemmiparous. Producing gemmae.
Geniculate. Bent abruptly, like a knee.
Gibbosity. A swelling of moderate extent and asymmetrical character, chiefly at or near the base of an organ.
Gibbous. Protuberant or swollen on one side.
Glabrate. Somewhat glabrous, or becoming glabrous.
Glabrous. Smooth; not rough, pubescent, or hairy.
Gladiate. Sword-shaped.
Gland. A secreting surface or structure; any protuberance or appendage having the appearance of such an organ.
Glandular. Bearing glands or of the nature of a gland.
Glaucous. Covered or whitened with a bloom.
Glochidiate. Barbed at the tip.
Glomerate. Compactly clustered.
Glomerulate. In small compact clusters.
Glumaceous. Furnished with or resembling glumes.
Glume. A chaff-like bract; specifically one of the two empty chaffy bracts at the base of the spikelet in the Grasses.
Granulose. Composed of or appearing as if covered by minute grains.
Gymnospermous. Bearing naked seeds, without an ovary.
Gynandrous. Having the stamens borne upon the pistil, as in *Orchidaceae*.
Gynobase. An enlargement or prolongation of the receptacle bearing the ovary.
Gynosporangium. The receptacle in which gynospores are developed.

Gynospore. One of the larger (female) reproductive bodies in the *Isoetaceae*, etc.
Gynostemium. The compound structure resulting from the union of the stamens and pistil in the *Orchidaceae.*

Habit. The general appearance of a plant.
Halberd-shaped. The same as Hastate.
Hastate. Like an arrow-head, but with the basal lobes pointing outward nearly at right angles.
Head. A dense cluster of sessile or nearly sessile flowers on a very short axis or receptacle.
Heart-shaped. Ovate with two rounded lobes and a sinus at base; commonly used to define such a base.
Herb. A plant with no persistent woody stem above ground.
Herbaceous. Having the characters of an herb; leaf-like in color and texture.
Heterocarpous. Producing more than one kind of fruit.
Heterogamous. Bearing two kinds of flowers.
Hilum. The scar or point of attachment of the seed.
Hirsute. Pubescent with rather coarse or stiff hairs.
Hirsutulous. Slightly hirsute.
Hirtellous. Minutely hirsute.
Hispid. Beset with rigid or bristly hairs or with bristles.
Hispidulous. Minutely hispid.
Hoary. Grayish-white with a fine close pubescence.
Homogamous. Bearing but one kind of flowers.
Hyaline. Transparent or translucent.
Hybrid. A cross-breed of two species.
Hygroscopic. Altering form or position through changes of moisture.
Hypochil. The (often fleshy or otherwise modified) basal portion of the labellum or lip in *Orchidaceae.*
Hypogynous. Situated on the receptacle beneath the ovary and free from it and from the calyx; having the petals and stamens so situated.

Imbricate. Overlapping, either vertically or spirally, where the lower piece covers the base of the next higher, or laterally, as in the aestivation of a calyx or corolla, where at least one piece must be wholly external and one internal.
Immersed. Growing wholly under water.
Impressed. Bent inward, hollowed or furrowed as if by pressure.
Incised. Cut sharply and irregularly, more or less deeply.
Included. Not at all protruded from the surrounding envelope.
Incumbent (cotyledons). Lying with the back of one against the radicle.
Indefinite (stamens, etc.). Inconstant in number or very numerous.
Indehiscent. Not opening by valves, etc.; remaining persistently closed.
Indigenous. Native and original to the region.
Indurated. Hardened.
Indusiate. Provided with an indusium.
Indusium. The proper (often shield-shaped) covering of the sorus or fruit dot in Ferns.
Inferior. Lower or below; outer or anterior. *Inferior ovary*, one that is adnate to the calyx.
Inflated. Bladdery.
Inflorescence. The flowering part of a plant, and especially the mode of its arrangement.
Infra-. In composition, below; as *infra-axillary*, below the axil.
Innovation. An offshoot from the stem.
Inserted. Attached to or growing out of.
Inter- or *Intra-.* In composition, between.
Interfoliaceous. Between the leaves of a pair, as the stipules of many *Rubiaceae.*
Internode. The portion of a stem between two nodes.
Intramarginal. Within and near the margin.
Introduced. Brought intentionally from another region, as for purposes of cultivation.
Introrse. Turned inward or toward the axis.
Involucel. A secondary involucre, as that of an umbellet in *Umbelliferae.*
Involucellate. Having an involucel.
Involucral. Belonging to an involucre.
Involucrate. Having an involucre.
Involucre. A circle or collection of bracts surrounding a flower cluster or head, or a single flower.
Involute. Rolled inward.
Irregular (flower). Showing inequality in the size, form, or union of its similar parts.

Keel. A central dorsal ridge, like the keel of a boat; the two anterior united petals of a papilionaceous flower.

Labellum. Lip; the peculiar upper (but by a twist of the pedicel apparently lower) petal of the *Orchidaceae.*
Labiate. Lipped; belonging to the *Labiatae.*
Labyrinthiform. With complicated sinuous lines or winding passages.
Lacerate. Irregularly cleft as if torn.
Laciniate. Slashed; cut into narrow pointed lobes.
Lamella. A thin flat plate or laterally flattened ridge.
Lanceolate. Shaped like a lance-head, several times longer than wide, broadest above the base and narrowed to the apex.
Leoflet. A single division of a compound leaf.
Legume. The fruit of the *Leguminosae*, formed of a simple pistil and usually dehiscent by both sutures.
Leguminous. Pertaining to a legume or to the *Leguminosae.*
Lemma. The lower of the two bracts inclosing the flower in the Grasses; sometimes called the flowering glume.
Lenticular. Lentil-shaped; of the shape of a double-convex lens.

Lepidote. Beset with small scurfy scales.
Ligulate. Furnished with a ligule.
Ligule. A strap-shaped corolla, as in the ray-flowers of *Compositae;* a thin often scarious projection from the summit of the sheath in Grasses.
Limb. The expanded portion of a gamopetalous corolla above the throat; the expanded portion of any petal, or of a leaf.
Linear. Long and narrow, with parallel margins.
Lip. Each of the upper and lower divisions of a bilabiate corolla or calyx; the peculiar upper (but by a twist of the pedicel apparently lower) petal in Orchids.
Lobe. Any segment of an organ, especially if rounded.
Lobed. Divided into or bearing lobes.
-locular. In composition, having cells.
Loculicidal. Dehiscent into the cavity of a cell through the dorsal suture.
Lunate. Of the shape of a half-moon or crescent.
Lyrate. Pinnatifid with a large and rounded terminal lobe and with the lower lobes small.

Macrosporangium. The receptacle in which macrospores are developed.
Macrospore. The larger kind of spore in *Selaginellaceae*, etc.
Malpighiaceous hairs. Hairs which are straight and appressed but attached by the middle.
Marcescent. Withering but persistent.
Membranaceous, Membranous. Thin, rather soft, and more or less translucent.
Meniscoidal. Thin and concavo-convex, like the crystal of a watch.
Mericarp. One of the achene-like carpels of *Umbelliferae.*
-merous. In composition, having parts, as 2-merous, having two parts of each kind.
Micropyle. The point upon the seed at which was the orifice of the ovule.
Microsporangium. The receptacle in which microspores are developed.
Microspore. The smaller kind of spore in *Selaginellaceae*, etc.
Midrib. The central or main rib of a leaf.
Mitriform. Shaped like a mitre or cap.
Monadelphous (stamens). United by their filaments into a tube or column.
Moniliform. Resembling a string of beads; cylindrical with contractions at intervals.
Monocotyledonous. Having but one cotyledon.
Monoecious. With stamens and pistils in separate flowers on the same plant.
Mucro. A short and small abrupt tip
Mucronate. Tipped with a mucro.
Multifid. Cleft into many lobes or segments.
Muricate. Rough with short hard points.
Muriculate. Very finely muricate.

Nectary. Any place or organ where nectar is secreted.
Nectariferous. Producing nectar.
Nerve. A simple or unbranched vein or slender rib.
Neuter, neutral. Without stamens or pistils.
Node. The place upon a stem which normally bears a leaf or whorl of leaves.
Nodose. Knotty or knobby.
Nodulose. Provided with little knots or knobs.
Nucleus. The germ-cell of the ovule, which by fertilization becomes the seed; the kernel of a seed.
Nut. A hard indehiscent 1-celled and 1-seeded fruit, though usually resulting from a compound ovary.
Nutlet. A diminutive nut.

Ob-. A Latin prefix, usually carrying the idea of inversion.
Obcompressed. Compressed dorso-ventrally instead of laterally.
Obconically. Inversely conical, having the attachment at the apex.
Obcordate. Inverted heart-shaped.
Oblanceolate. Lanceolate with the broadest part toward the apex.
Oblique. Unequal-sided or slanting.
Oblong. Longer than broad and with nearly parallel sides.
Obovate. Inverted ovate.
Obovoid. Having the form of an inverted egg.
Obsolescent. Becoming rudimentary.
Obsolete. Not evident; rudimentary.
Obtuse. Blunt or rounded at the end.
Ochroleucous. Yellowish-white.
Ocrea. A legging-shaped or tubular stipule.
Ocreate. Having sheathing stipules.
Officinal. Of the shops; used in medicine or the arts.
Oöspore. The fertilized nucleus or germ-cell of the archegonium in Cryptogams, from which the new plant is directly developed.
Opaque. Dull; neither shining nor translucent.
Operculate. Furnished with a lid.
Operculum. A lid; the upper portion of a circumscissile capsule.
Orbicular. Circular.
Orthotropous (ovule or seed). Erect, with the orifice or micropyle at the apex.
Ovary. The part of the pistil that contains the ovules.
Ovate. Egg-shaped, having an outline like that of an egg, with the broader end downward.
Ovoid. A solid with an oval outline.
Ovule. The body which after fertilization becomes the seed.
Ovuliferous. Bearing ovules.

Palate. A rounded projection on the lower lip of a personate corolla, closing the throat.
Palea, Palet. The upper bract which with the lemma incloses the flower in Grasses.
Paleaceous. Chaffy
Paleophytological. Relating to the study of fossil plants.
Palmate (leaf). Radiately lobed or divided.
Palmately. In a palmate manner.
Palustrine. Of or growing in marshes.
Pandurate, Panduriform. Fiddle-shaped.
Panicle. A loose irregularly compound inflorescence with pedicellate flowers.

Panicled, Paniculate. Borne in a panicle; resembling a panicle.
Papilionaceous (corolla). Having a standard, wings, and keel, as in the peculiar corolla of many *Leguminosae.*
Papillose. Bearing minute nipple-shaped projections.
Pappus. The modified calyx-limb in *Compositae*, forming a crown of very various character at the summit of the achene.
Parasitic. Growing on and deriving nourishment from another plant.
Parenchyma. Soft tissue of cells with unthickened walls.
Parietal. Borne on or pertaining to the wall or inner surface of a capsule.
Parted. Cleft nearly but not quite to the base.
Parthenogenetic. Developing without fertilization.
Partial. Of secondary rank.
Pathological. Diseased.
Pectinate. Pinnatifid with narrow closely set segments; comb-like.
Pedate. Palmately divided or parted, with the lateral segments 2-cleft.
Pedicel. The support of a single flower.
Pedicellate. Borne on a pedicel.
Peduncle. A primary flower-stalk, supporting either a cluster or a solitary flower.
Pedunculate. Borne upon a peduncle.
Pellucid. Clear, transparent.
Peltate. Shield-shaped and attached to the support by the lower surface.
Pendulous. More or less hanging or declined. *Pendulous ovule*, one that hangs from the side of the cell.
Perennial. Lasting year after year.
Perfect (flower). Having both pistil and stamens.
Perfoliate (leaf). Having the stem apparently passing through it.
Perianth. The floral envelope, consisting of the calyx and corolla (when present), whatever their form.
Pericarp. The matured ovary.
Perigynium. The inflated sac which incloses the ovary in *Carex.*
Perigynous. Adnate to the perianth, and therefore around the ovary and not at its base.
Peripheral. On or near the margin.
Persistent. Long-continuous, as a calyx upon the fruit, leaves through winter, etc.
Personate (corolla). Bilabiate, and the throat closed by a prominent palate.
Petal. A division of the corolla.
Petaloid. Colored and resembling a petal.
Petiolate. Having a petiole.
Petiole. The footstalk of a leaf.
Phaenogamous. Having flowers with stamens and pistils and producing seeds.
Phyllodium (pl. *Phyllodia*). A somewhat dilated petiole having the form of and serving as a leaf-blade.
Phytological. Relating to the study of plants.
Pilose. Hairy, especially with soft hairs.
Pinna (pl. *Pinnae*). One of the primary divisions of a pinnate or compoundly pinnate frond or leaf.
Pinnate (leaf). Compound, with the leaflets arranged on each side of a common petiole.
Pinnatifid. Pinnately cleft.
Pinnule. A secondary pinna; one of the pinnately disposed divisions of a pinna.
Pistil. The seed-bearing organ of the flower, consisting of the ovary, stigma, and style when present.
Pistillate. Provided with pistils, and, in its more proper sense, without stamens.
Pitted. Marked with small depressions or pits.
Placenta. Any part of the interior of the ovary which bears ovules.
Plicate. Folded into plaits, usually lengthwise.
Plumose. Having fine hairs on each side, like the plume of a feather, as the pappus-bristles of some Thistles.
Plumule. The bud or growing point of the embryo.
Pod. Any dry and dehiscent fruit.
Pollen. The fecundating grains contained in the anther.
Polliniferous. Bearing pollen.
Pollinium (pl. *Pollinia*). A mass of waxy pollen or of coherent pollen-grains, as in *Asclepias* and *Orchidaceae.*
Polypetalous. Having separate petals.
Pome. A kind of fleshy fruit of which the apple is the type.
Porose. Pierced with small holes or pores.
Posterior. In an axillary flower, on the side nearest to the axis of inflorescence.
Praemorse. Appearing as if bitten off.
Prickle. A small spine or more or less slender sharp outgrowth from the bark or rind.
Prismatic. Of the shape of a prism, angular, with flat sides, and of nearly uniform size throughout.
Procumbent. Lying on the ground or trailing but without rooting at the nodes.
Proliferating, Proliferous. Producing offshoots.
Prostrate. Lying flat upon the ground.
Proterogynous. Having the stigma ripe for the pollen before the maturity of the anthers of the same flower.
Prothallus. A cellular usually flat and thallus-like growth, resulting from the germination of a spore, upon which are developed sexual organs or new plants.
Puberulent. Minutely pubescent.
Pubescent. Covered with hairs, especially if short, soft and down-like.
Pulverulent. Powdered; appearing as if covered by minute grains of dust.
Punctate. Dotted with depressions or with translucent internal glands or colored dots.
Puncticulate. Minutely punctate.
Pungent. Terminating in a rigid sharp point, acrid.
Putamen. The shell of a nut; the bony part of a stone-fruit.
Pyriform. Pear-shaped.

Quadrate. Nearly square in form.

Raceme. A simple inflorescence of pediceled flowers upon a common more or less elongated axis.
Racemose. In racemes; or resembling a raceme.
Radiate. Spreading from or arranged around a common center; bearing ray-flowers.
Radical. Belonging to or proceeding from the root or base of the stem near the ground.
Radicle. The portion of the embryo below the cotyledons, more properly called the caudicle.
Rameal. Belonging to a branch.
Ramification. Branching.
Ray. The branch of an umbel; the marginal flowers of an inflorescence when distinct from the disk.
Receptacle. The more or less expanded or produced portion of an axis which bears the organs of a flower (the *torus*) or the collected flowers of a head; any similar structure in Cryptogams.
Recurved. Curved downward or backward.
Reflexed. Abruptly bent or turned downward.
Regular. Uniform in shape or structure.
Reniform. Kidney-shaped.
Repand. With a slightly uneven and somewhat sinuate margin.
Repent. Creeping; prostrate and rooting at the nodes.
Resiniferous. Producing resin.
Resupinate. Turned upside down.
Reticulate. In the form of network; net-veined.
Retrorse. Directed back or downward.
Retuse. With a shallow notch at a rounded apex.
Revolute. Rolled backward from the margins or apex.
Rhachilla. A secondary axis; specifically in the Grasses and Sedges the floral axis as opposed to that of the spike or spikelet.
Rhachis. The axis of a spike or of a compound leaf.
Rhaphe. The ridge or adnate funicle which in an anatropous ovule connects the two ends.
Rhaphides. Needle-shaped crystals often occurring in bundles within the cells of certain plants.
Rhizome. Any prostrate or subterranean stem, usually rooting at the nodes and becoming erect at the apex.
Rib. A primary or prominent vein of a leaf.
Ringent. Gaping, as the mouth of an open bilabiate corolla.
Root. The underground part of a plant which supplies it with nourishment.
Rootstock. Same as Rhizome.
Rostellum. A little beak: a slender extension from the upper edge of the stigma in Orchids.
Rostrate. Having a beak.
Rosula. A rosette.
Rosulate. In the form of a rosette.
Rotate (corolla). Wheel-shaped; flat and circular in outline.
Rufous. Reddish-brown.
Rugose. Wrinkled.
Runcinate. Sharply incised, with the segments directed backward.
Runner. A filiform or very slender stolon.

Saccate. Sac-shaped.
Sagittate. Shaped like an arrow-head, the basal lobes directed downward.
Salver-shaped (corolla). Having a slender tube abruptly expanded into a flat limb.
Samara. An indehiscent winged fruit.
Scabridulous. Slightly rough.
Scabrous. Rough to the touch.
Scape. A peduncle rising from the ground, naked or without proper foliage.
Scapose. Bearing or resembling a scape.
Scarious. Thin, dry, and membranaceous, not green.
Sclerenchymatous. Of sclerenchyma, that is, of tissue composed of cells with thickened and hardened walls.
Scorpioid (inflorescence). Circinately coiled while in bud.
Seed. The ripened ovule, consisting of the embryo and its proper coats.
Segment. One of the parts of a leaf or other like organ that is cleft or divided.
Sepal. A division of a calyx.
Septate. Divided by partitions.
Septicidal (capsule). Dehiscing through the partitions and between the cells.
Septum. Any kind of partition.
Serrate. Having sharp teeth pointing forward.
Serrulate. Finely serrate.
Sessile. Without footstalk of any kind.
Seta. A bristle.
Setaceous. Bristle-like.
Setiform. Bristle-shaped.
Setose. Beset with bristles.
Setulose. Having minute bristles.
Sheath. A tubular envelope, as the lower part of the leaf in Grasses.
Sheathing. Inclosing as by a sheath.
Shrub. A woody perennial, smaller than a tree, usually with several stems.
Silicle. A short silique.
Silique. The peculiar pod of *Cruciferae.*
Silky. Covered with close-pressed soft and straight pubescence.
Simple. Of one piece; not compound.
Sinuate. With the outline of the margin strongly wavy.
Sinus. The cleft or recess between two lobes.
Smooth. Without roughness or pubescence.
Sobole. A shoot, especially from the ground.
Soboliferous. Bearing soboles.
Sorus (pl. *Sori*). A heap or cluster, applied to the fruit dots of Ferns.
Spadix. A spike with a fleshy axis.
Spathe. A large bract or pair of bracts inclosing an inflorescence.
Spatulate. Gradually narrowed downward from a rounded summit.
Spermatozoid. A motile ciliated male reproductive cell.
Spicate. Arranged in or resembling a spike.
Spiciform. Spike-like.

Spike. A form of simple inflorescence with the flowers sessile or nearly so upon a more or less elongated common axis.
Spikelet. A small or secondary spike.
Spindle-shaped. Same as Fusiform.
Spine. A sharp woody or rigid outgrowth from the stem.
Spinose. Spine-like, or having spines.
Spinule. A little spine or spine-like process.
Sporangium. A spore-case.
Spore. The reproductive organ in Cryptogams which in function corresponds to a seed but possesses no embryo.
Sporocarp. The fruit-cases of certain Cryptogams containing sporangia or spores.
Sporophyll. A leaf bearing spores.
Spur. A hollow sac-like or tubular extension of some part of a blossom, usually nectariferous.
Squarrose. Having its parts or processes (such as the tips of involucral scales) spreading or recurved at the end.
Squarrulose. Diminutively squarrose.
Stamen. One of the pollen-bearing organs of the flower.
Staminode or *Staminodium.* A sterile stamen, or any structure without anther corresponding to a stamen.
Standard. The upper dilated petal of a papilionaceous corolla.
Stellate, Stelliform. Star-shaped.
Stem. The main ascending axis of a plant.
Sterile. Unproductive, as a flower without pistil, or stamen without an anther.
Stigma. That part of a pistil through which fertilization by the pollen is effected.
Stigmatic. Belonging to or characteristic of the stigma.
Stipe. The stalk-like support of a pistil; the leaf-stalk of a Fern.
Stipitate. Having a stipe.
Stipular. Belonging to stipules.
Stipulate. Having stipnles.
Stipule. An appendage at the base of a petiole or on each side of its insertion.
Stolon. A runner, or any basal branch that is disposed to root.
Stoloniferous. Producing stolons.
Stoma (pl. *Stomata*). An orifice in the epidermis of a leaf communicating with internal air-cavities.
Stramineous. Straw-colored.
Striate. Marked with fine longitudinal lines or ridges.
Strict. Very straight and upright.
Strigose. Beset with appressed sharp straight and stiff hairs.
Strobile. An inflorescence marked by imbricated bracts or scales, as in the Hop and Pine-cone.
Strophiole. An appendage at the hilum of certain seeds.
Style. The usnally attenuated portion of the pistil connecting the stigma and ovary.
Stylopodium. A disk-like expansion at the base of a style, as in *Umbelliferae.*
Sub-. A Latin prefix, usually signifying somewhat or slightly.
Subulate. Awl-shaped.
Succulent. Juicy; fleshy.
Suffrutescent. Slightly or obscurely shrubby.
Suffruticose. Very low and woody; diminutively shrnbby.
Sulcate. Grooved or furrowed.
Superior (ovary). Free from the calyx.
Supra-axillary. Borne above the axil.
Surculose. Producing suckers.
Suspended (ovule). Hanging from the apex of the cell.
Suture. A line of dehiscence.
Symmetrical (flower). Regular as to the number of its parts; having the same number of parts in each circle.

Teratological. Monstrous; relating to a monstrosity.
Terete. Having a circular transverse section.
Ternate. In threes.
Testa. The outer commonly hard and brittle seed-coat.
Tetradynamous. Having four long and two shorter stamens.
Tetragonal. Fonr-angled.
Thalloid, Thallose. Resembling a thallus.
Thallus. In Cryptogams, a cellular expansion taking the place of stem and foliage.
Throat. The orifice of a gamopetalous corolla or calyx; the part between the proper tube and the limb.
Thyrse. A contracted cylindrical or ovoid and usually compact panicle.
Thyrsoid. Resemhling a thyrse.
Tomentose. Densely pubescent with matted wool.
Torose. Cylindrical with contractions at intervals.
Torulose. Diminutive of torose.
Torus. The receptacle of a flower.
Tri-. In composition, three or thrice.
Triandrous. Having three stamens.
Trifoliolate. Having three leaflets.
Trigonous. Three-angled.
Trimorphous. Occurring under three forms.
Triquetrous. Having three salient angles, the sides concave or channeled.
Truncate. Ending abruptly, as if cut off transversely.
Tuber. A thickened and short subterranean branch having numerous huds or eyes.
Tubercle. A small tuber or tuber-like (not necessarily subterranean) body.
Tuberiferous. Bearing tubers.
Tuberoid. A fleshy-thickened root, resembling a tuber.
Tuberous. Having the character of a tuber; tuber-like in appearance.
Tumid. Swollen.
Tunicated. Having concentric coats, as an onion.
Turbinate. Top-shaped; inversely conical.
Turgid. Swollen, or tightly drawn, said of a membrane or covering expanded by pressure from within.

Umbel. An inflorescence in which the peduncles or pedicels of a cluster spring from the same point.
Umbellate. In or like an umbel.
Umbellet. A secondary umbel.
Umbelliform. In the shape of an umbel.
Umbellule. An umbellet.
Umbonate. Bearing a stout projection in the center; bossed.
Undulate. With a wavy surface; repand.
Unguiculate. Contracted at base into a claw.
Uni-. In composition, one.
Unisexual. Of one sex, either staminate or pistillate only.
Urceolate. Hollow and cylindrical or ovoid, and contracted at or below the mouth, like an urn.
Utricle. A small bladdery 1-seeded fruit; any small bladder-like body.

Vallecular. Of or near a valley or groove.
Valvate. Opening by valves, as a capsule; in aestivation, meeting by the edges without overlapping.
Valve. One of the pieces into which a capsule splits.
Vascular. Furnished with vessels or ducts.
Veins. Threads of fibro-vascular tissue in a leaf or other organ, especially those which branch (as distinguished from nerves).
Velum. The membranous indusium in *Isoëtes.*
Ventral. Belonging to the anterior or inner face of an organ; the opposite of dorsal.
Ventricose. Swelling unequally, or inflated on one side.
Vermiform. Worm-shaped.
Vernation. The arrangement of leaves in the bud.
Verrucose. Covered with wart-like elevations.
Versatile (anther). Attached near the middle and turning freely on its support.
Verticil. A whorl.
Verticillaster. A cluster resembling a whorl but composed of two opposite cymes.
Verticillastrate. Bearing or arranged in clusters resembling whorls.
Verticillate. Disposed in a whorl.
Vesicle. A small bladder or air-cavity.
Vesicular, Vesiculose. Composed of or covered with vesicles.
Villous. Bearing long and soft hairs.
Virgate. Wand-shaped; slender, straight and erect.
Viscid. Glutinous; sticky.
Vitta. An oil-tube; a structure commonly present in the pericarp of the *Umbelliferae.*

Whorl. An arrangement of leaves, etc., in a circle round the stem.
Wing. Any membranous or thin expansion bordering or surrounding an organ; the lateral petal of a papilionaceous corolla.
Woolly. Clothed with long and tortuous or matted hairs.

Zygomorphic. Capable of division by only one plane of symmetry.

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